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ABSTRACT

A study of the characteristics of rural counties that gained or failed to gain young physicians examined location choices of all physicians who graduated from allopathic and osteopathic schools of medicine between 1974 and 1978 and were practicing in a primary care specialty in 2,111 rural counties in 1983. First, the characteristics of counties in which young physicians were located were compared with the characteristics of counties that failed to attract young physicians and significant differences were identified. The 1,228 gaining counties tended to have more population, higher population growth rates, greater population density, a better educated population, higher income, less agriculture, and more health resources than the 883 counties that did not gain a physician. The findings suggest that there are differences between the counties selected by National Health Service Corps (NHSC) alumni and non-alumni and that, for NHSC alumni particularly, factors other that the characteristics of communities appear to intervene in the location decision. It seems likely that the NHSC service itself is one of those intervening variables. This is suggested by the fact that satisfaction with aspects of the NHSC experience is positively associated with a decision to choose rural and Health Manpower Shortage Area practice. Numerous data tables supplement the text. (JHZ)

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ED273416

*Young Physicians in Rural Areas: The Impact of Service in the National Health Service Corps*

# County Characteristics

VOLUME

# 1

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## Preface

In September 1983 the Public Health Service began a study of factors influencing the location and practice patterns of young physicians who recently settled in rural areas. The purpose of the study was to obtain basic data on all young MDs and DOs in rural areas and to determine whether physicians who served in the National Health Service Corps exhibited different location choices and practice patterns from those who did not serve. The results of the study are contained in a two volume report prepared by the contractor, Mathematica Policy Research, Inc., on July 31, 1985.

The report is entitled "Young Physicians in Rural Areas: The Impact of Service in the National Health Service Corps, Volumes I and II." Volume I, "County Characteristics" describes the characteristics of the rural counties selected by all primary care physicians who graduated from medical school between 1974 and 1978. Volume II, "Survey of Factors Influencing the Location Decision and Practice Patterns", presents the results of a survey from a sample of these physicians conducted in the Fall of 1984.

This study builds upon the results of a previous study also conducted by Mathematica Policy Research, Inc., "Evaluation of the Effects of National Health Service Corps Physician Placements Upon Medical Care Delivery in Rural Areas." That study was completed in 1982 and the results were presented in a comprehensive summary report and in a series of 11 technical reports.

This project was supported by several organizations within the Public Health Service. In the Health Resources and Services Administration, these included the Office of Planning, Evaluation and Legislation (OPEL), the Bureau of Health Care Delivery and Assistance (BHCDA), and the Bureau of Health Professions (BHPr). Support was also provided by the Office of Health Planning and Evaluation of the Office of the Assistant Secretary for Health.

John Drabek of the Office of Data Analysis and Management, BHPr, served as Project Officer. Dan Calvin of the National Health Service Corps, BHCDA was the original Project Officer.

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# EXECUTIVE SUMMARY

## Overview of Study and Findings

The mission of the National Health Service Corps is to improve delivery of health services in Health Manpower Shortage Areas (HMSAs) by the appropriate placement of health professionals and health resources. This study was undertaken to determine:

- the characteristics of rural communities which are attractive to young physicians
- to what extent NHSC physicians have remained in the locations to which they were assigned after completing their service (NHSC alumni)
- the factors which influence young physicians' choice of a rural or HMSA practice location and, for NHSC alumni and non-alumni, whether these factors are different
- the practice characteristics of young physicians in rural and HMSA locations and whether these practice characteristics differ for NHSC alumni and non-alumni

Analyses were conducted using Area Resource File data on characteristics of rural counties and data on individual physicians' characteristics which were obtained through a survey of young physicians in primary care practice in non-metropolitan areas.

Major findings emerging from this study include:

- Rural counties which were most likely to gain a young physician were more populous and had more health resources; this finding is consistent with expectations based upon earlier studies of the geographic diffusion as the supply of physicians increases.
- In addition to population and health resources, the presence of a college, greater white collar employment, and less farm population were factors which were associated with the ability of rural counties to attract young physicians. However, NHSC alumni located in counties that had lower population density, were less likely to have a hospital, and were more likely to be whole county HMSAs.

- Of those alumni who located in a rural area after completing their NHSC service, over 70 percent remained in the site to which they were assigned. Since NHSC alumni report fewer prior contacts with rural areas than non-alumni, there seems to be considerable evidence that the NHSC experience has a strong effect on subsequent location decisions of alumni. This is also suggested by the fact that the analytic results indicate that satisfaction with aspects of the NHSC experience is associated with HMSA location choices.

- Analysis of practice patterns of NHSC alumni and non-alumni in rural areas reveals comparable work loads. However, NHSC alumni are more accessible to the underserved--seeing more Medicaid patients, using sliding fee scales and discounts more frequently and accepting assignment for Medicare claims more often. These differences are particularly pronounced for alumni who are in HMSA locations. Some of these differences may be due to differences in the measurable and unmeasurable characteristics of the two groups of physicians, but the results are also consistent with the impact of their NHSC service since we have observed similar practice patterns in the previous studies of NHSC service.

- The practice patterns reported by NHSC physicians serving under the Private Practice Option (PPO) are consistent with prior expectations. PPOs see slightly fewer patients than other physicians, perhaps because they are less experienced and established than the other physicians. However, because the NHSC program has evolved so substantially in recent years it may be difficult to generalize from data on PPO physicians who selected locations in the summer of 1983 or earlier.

## Purpose of This Study

The purpose of this study was to answer several specific questions about the effect of the NHSC on the geographic location and practice patterns of alumni:

- Of NHSC alumni practicing in rural areas, what proportion remained in the rural area where they completed their NHSC service?

- Of all young physicians graduating between 1974 and 1978 who have chosen primary care practice in a rural community, what factors influenced the choice of a specific community? Are there detectable differences in the

factors which influenced the location choices of NHSC alumni and non-alumni?

- Do the practice characteristics of NHSC alumni appear to have been influenced by their exposure to the NHSC? Do alumni and non-alumni report different practice characteristics?

- What characteristics of rural communities distinguish counties which are attractive to young physicians from those counties which do not attract physicians? Are rural counties which are attractive to NHSC alumni different from counties which are attractive to non-alumni?

It is anticipated that the results of this evaluation will assist the Health Resources and Services Administration in its efforts to adapt the NHSC program in the current market environment characterized by increasing physician supply and stronger competitive pressures influencing new physicians' location patterns. Therefore, the focus of this evaluation has been on identifying information which HRSA may use in selecting, placing, and monitoring the practice characteristics of NHSC physicians in order to increase retention and to provide services to areas least likely to obtain physicians' services independently.

## Findings: Characteristics of Rural Communities Which Gain Young Physicians

The study of the characteristics of rural counties which gained or failed to gain young physicians examined location choices of all physicians who graduated from allopathic and osteopathic schools of medicine between 1974 and 1978 and were practicing in a primary care specialty in 2,111 rural counties in 1983. First, the characteristics of counties in which young physicians were located were compared with the characteristics of counties which failed to attract young physicians and significant differences were identified. The 1,228 gaining counties tended to have more population, higher population growth rates, greater population density, a better educated population, higher income, less agriculture, and more health resources than the 883 counties which did not gain a physician.

Even among the counties that gained young physicians there were differences. NHSC alumni tended to choose areas that had smaller populations, lower population density, lower income levels, higher unemployment rates, fewer health resources, and less health care utilization when compared with the areas selected by non-NHSC physicians. About 81 percent of the counties where NHSC alumni practice were designated as Health Manpower Shortage Areas (either whole or part county HMSAs), as compared with 53 percent of the counties which attracted non-NHSC physicians. In about 5 percent of the counties that gained young physicians, an NHSC alumnus was the only young physician to establish practice there.

These descriptive findings were used to guide the multivariate analysis of the impact of specific community characteristics on the probability that a young physician would locate in a specific county, and the interrelationships of groups of variables. Results of the multivariate analysis suggest that counties are more likely to be attractive to young physicians, in general, when they have:

- o Greater population
- o More physicians
- o A college
- o Greater white collar employment
- o Less farm population

A somewhat different set of factors are associated with the counties which are selected by NHSC alumni. The probability that an alumnus will locate in a county is related to:

- o Lower population density
- o Higher per capita educational expenditures
- o No hospital
- o Lower farm population
- o Whole county HMSA designation

Although population and physician-to-population ratio are positively associated with the alumni's location choices, the magnitude of the effect is much less than for non-NHSC alumni choices. These findings suggest that there are differences between the counties selected by NHSC alumni and non-alumni and that, for NHSC alumni particularly, factors other than the characteristics of communities appear to intervene in the location decision. It seems likely that the NHSC service, itself, is one of those intervening variables.

## Individual Physicians' Location Choices

Using data obtained through a survey of 1974-1978 graduates of allopathic and osteopathic schools of medicine who were located in rural areas and were practicing as primary care physicians, the factors which influenced their choice of location were examined descriptively and using multivariate techniques. A major finding of the descriptive analyses is

that NHSC alumni located in rural areas report substantially fewer prior contacts with rural areas than do non-alumni; osteopathic physicians report the highest number of prior contact events.

Results of the multivatiate analysis of young physicians' location choices indicate that the NHSC experience has affected the choices of NHSC alumni. Although alumni have fewer prior contacts with rural areas, the rural NHSC experience often immediately precedes the permanent location decision and, consequently, may exert a particularly strong influence. This is suggested by the fact that satisfaction with aspects of the NHSC experience is positively associated with a decision to choose rural and HMSA practice. It is also noteworthy that, for alumni, organized community recruitment efforts are reported to have a significant positive effect on the decision for HMSA practice.

## Analysis of Young Physicians' Practice Patterns

The focus of this study area was to determine whether the practice patterns of NHSC alumni are different from, or similar to, the practice patterns of young physicians who did not serve in the NHSC. In addition, the practice characteristics of Private Practice Option physicians while fulfilling their NHSC obligation in 1984-85 were examined. Data for this analysis were obtained through the survey of young physicians conducted between October 1984 and January 1985.

Results of the comparison of practice patterns indicate that there are differences between NHSC alumni and non-alumni. Alumni practice patterns include:

- higher proportions of patients from whole HMSA counties
- more Community Health Center and Migrant Health Center practice
- greater use of nurse practitioners
- more evening practice hours
- more Medicaid patients
- higher rates of acceptance of assignment for Medicare claims
- more frequent use of sliding fee scales and discounts of fees.

These differences, however, do not appear to be wholly attributable to the NHSC experience. NHSC alumni are somewhat more likely to be in general and family practice, are less frequently board certified, much more likely to

practice in a HMSA, and are underrepresented in the South and overrepresented in the West, compared to non-alumni. These differences between the two groups may explain a substantial portion of the practice characteristics differences observed.

Physicians who practice in non-HMSAs exhibit similar practice patterns whether or not they served in the NHSC. However, differences are observed in the practice patterns of alumni and non-alumni who practice in HMSAs. Evidently, for alumni who remain in HMSA practice, some Corps effect appears to have influenced their subsequent practice patterns.

When the practice patterns of recent PPOs are examined, the findings indicate that:

- While 16% were in Community Health Centers or Migrant Health Centers, the majority of PPOs are in solo and partnership/group practice arrangements.
- PPOs see fewer patients, on average, than do NHSC alumni and non-alumni, but report working more hours.
- About 20 percent of patients seen in all settings are Medicaid beneficiaries.
- PPOs in MHCs see the largest number of patients and work the longest hours.
- Nearly 80 percent of PPOs are GP/FP physicians; the remainder are IM and PD physicians.
- There is little difference between board certified and non-board certified PPOs in practice characteristics.

However, these results must be viewed with caution since the PPOs surveyed were in practice prior to January 1984. Substantial changes were made in the NHSC placement program in 1984. Consequently, current PPOs and PPAs may exhibit different practice patterns.

# I. INTRODUCTION

## A. BACKGROUND

The mission of the National Health Service Corps Program is to improve the delivery of health services in Health Manpower Shortage Areas (HMSA) by the appropriate placement of health professionals and health resources. The purpose of this study was to evaluate the retention of NHSC physician alumni in Health Manpower Shortage Areas, to document the distribution and practice characteristics of NHSC alumni, current PPOs, and non-NHSC physicians, and to examine the characteristics of rural communities which have been attractive to NHSC and non-NHSC physicians over the past decade. In addition, this evaluation examined the effect of the NHSC experience on subsequent practice patterns (e.g. use of auxiliary personnel, fee structures, patient characteristics) of alumni.

It is anticipated that the results of this evaluation will be of considerable assistance to the Health Resources and Services Administration in its efforts to refine and refocus the NHSC program in the current market environment characterized by increasing physician supply and stronger competitive pressures influencing new physicians' location patterns. The focus of this evaluation is on identifying information which HRSA may use in selecting, placing, and monitoring the practice characteristics of NHSC physicians in order to increase retention and to provide services to areas least likely to obtain physicians' services independently.

## B. PURPOSE OF THIS REPORT

The research to be conducted under this contract falls into three major categories:

- descriptive profiles of rural and shortage areas communities which have lost, retained, and/or gained new physicians between 1972 and 1983
- multivariate analysis of the relationship between specific community characteristics and the probability of physicians' location
- descriptive and multivariate analysis of
  - -- the urban-rural location choice of 1979 NHSC physicians
  - -- the HMSA-non HMSA location choices of NHSC and non-NHSC physicians
  - -- the practice characteristics of NHSC and non-NHSC physicians

The purpose of this report is to present the findings of the community profiles analysis, including descriptive profiles of rural and shortage areas which have lost, retained, or gained young physicians between 1972 and 1983, and to describe the results of the multivariate analysis of the impact of community characteristics on the probability that young physicians will locate in specific communities.

The descriptive community profiles were prepared in two stages:

STAGE 1: Profiles were developed for rural communities and HMSAs which between 1975 and 1979: (1) experienced a net loss of physicians under age 35; (2) experienced a net gain of physicians under age 35; and (3) maintained a constant number of under age 35 physicians. This analysis was conducted using data from the Area Resource File only.

STAGE 2: Profiles were developed for rural communities and HMSAs which gained or did not gain young physicians who are NHSC alumni, current PPOs, and non-NHSC physicians. Data used for this analysis are from the American Medical Association, the NHSC Alumni File, the NHSC PPO File, the Area Resource File, and the City and County Data Book File.

The purpose of the descriptive community profiles analysis was to identify differences in the characteristics of rural and HMSA communities which:

- gained or failed to gain young physicians
- gained or failed to gain specific categories of young physicians (i.e. NHSC alumni, current PPOs, and non-NHSC physicians).

Results of the descriptive analysis were a set of distinguishing characteristics of communities which were used to guide the multivariate analysis of the relationship between community characteristics and the probability that a specific county will gain any young physician, an NHSC alumni, or a non-alumni.

## C. OVERVIEW OF THIS REPORT

This volume of the Final Report summarizes the analysis of communities and the relationship between their characteristics and the

location decisions of young physicians. Volume II of the Final Report presents the findings of the analyses of survey data focusing on the factors influencing location decisions of individual physicians and their practice characteristics.

Chapter II of this report discusses the data and methodology used to analyze the characteristics of communities which gained or did not gain young physicians. In Chapter III the findings of the Stage 1 analysis, which examines the change in the supply of young physicians in rural counties between 1975 and 1979, are presented. Results of the Stage II analysis, which examines the characteristics of communities in which 1974-1978 medical school graduates located, are discussed in Chapter IV. Chapter V summarizes the results of the multivariate analysis of the relationship between community characteristics and young physicians' location choices.

A summary and discussion of findings in Chapter VI concludes Volume I of this Final Report. Throughout this study, the emphasis has been on determining whether NHSC alumni are similar to or different from non-alumni in their location patterns; thus, each analysis focuses on comparison of these two groups.

## II. DATA AND METHODOLOGY

### A. OVERVIEW

In the Research Design (submitted December 30, 1983), a number of characteristics of communities which have been identified, in previous research, as attractive to physicians choosing a practice location were discussed. These characteristics are presented in Table II.1 and the specific variable and data source capturing that characteristic is shown. This list represents the community characteristics which will be compared for the subgroups of counties to be analyzed during this phase of the evaluation. Table II.2 provides a definitional description of each variable included in the analysis.

### B. DATA AND METHODOLOGY FOR THE STAGE 1 ANALYSIS

All data to be used for the Stage 1 community profiles analysis are from the Area Resource File, a computer file developed and maintained by the Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services. This data set contains information on population characteristics, health facilities, health manpower, health status of the population, economic activity, and environment for each county in the United States.

The Area Resource File contains detailed data on physicians by specialty and age for 1975 and 1979 which permit the examination of flows of young physicians into counties over this period. The number of physicians under age 35 in 1975 is subtracted from the number of physicians under age 35 in 1979 to identify counties with net gains between 1975 and 1979. The assignment of counties to three categories: (1) Net gainers, (2) No change, and (3) Net losers is conducted by calculating:

$$MDSLT35_{1979} - MDSLT35_{1975} \qquad \begin{array}{l} > 0 = \text{NETGAIN} \\ = 0 = \text{NOCHG} \\ < 0 = \text{NETLOSS} \end{array}$$

Thus, NETGAIN, NOCHG, AND NETLOSS measure the ability of counties to attract and retain young physicians. This measure is not perfect — we are not tracking individual physicians, but flows of physicians on an aggregate basis. If, for example, a particular county experienced no change in the number of physicians under age 35 between 1975 and 1979, we have no way to determine whether there was: (1) no change; (2) young physicians aged into the next age group and were replaced by new young physicians who chose to locate in that county between 1975 and 1979; or (3) some young physicians who practiced in the area decided to leave between 1975 and 1979, but were replaced by new young physicians.

The calculation of the mean values or the community characteristics of interest for the three groups of counties is done for several categories:

- o all non-metropolitan counties
- o non-metropolitan counties by Census Region
- o non-metropolitan counties by population size
  - -- under 10,000
  - -- 10,000 to 24,999
  - -- 25,000 and over
- o non-metropolitan counties by HMSA status
  - -- non-HMSA
  - -- partial HMSA
  - -- whole county HMSA

For this analysis, non-metropolitan counties are defined as those counties which are not part of a Standard Metropolitan Statistical Area (SMSA) and which have less than 50,000 population.

In addition to examining the patterns of community characteristics across the NETGAIN, NOCHG, and NETLOSS spectrum, we use a one-tailed t-test to detect significant differences in the means of community characteristics for two groups of counties:

- o Those counties which gained 1 or more new physicians between 1975 and 1979 (NETGAIN)
- o Those counties which lost 1 or more physicians between 1975 and 1979 (NETLOSS).

We exclude from this analysis the category NOCHG, since we cannot determine whether a county with no change between 1975 and 1979 gained a new physician by 1979 who replaced a 1975 under 35 physician who aged or migrated by 1979, or actually experienced no change in the number of under age 35 physicians.

Although the focus of this study is on young physicians and their location patterns, it is also of interest to examine the relationship between changes in the supply of young physicians and changes in the total supply of physicians in a county. An area may attract one or more young physicians, but may lose more physicians to death, retirement, or migration. Similarly, a county may <u>not</u> attract young physicians because one or more older physicians migrate into the area. To examine these relationships we have arrayed the changes in total supply of physicians (i.e NETGAIN, NOCHG, NETLOSS for all M.D.s) for each category of changes in the supply of young physicians. Thus, for all counties which gained 1 or more young physicians,

we determine the proportion which gained, remained constant, and lost in total physician supply. This examination provides an indication of the extent to which young physicians are increasing total supply, rather than merely replacing physicians leaving active practice.

A final area of interest for this study is the magnitude of increases in young physician supply and the extent to whch there is variation on the absolute number of young physicians gained by Census Region, county population grouping, and by HMSA status. If all young physicians are faced with becoming the sole new entrant in most rural counties, this may have implications for the ability of rural counties to attract young physicians. Counties which may support a greater number of new physicians may be perceived as more desirable locations.

## C. DATA AND METHODOLOGY FOR THE STAGE 2 ANALYSIS

The Stage 2 analysis of the characteristics of communities is conducted using data provided by the American Medical Association on the non-SMSA location choices of all 1974 through 1978 graduates of U.S. medical schools who are practicing in primary care specialties,* and data on the current locations of NHSC alumni and current PPOs.

Several categories of physicians will be distinguished for this analysis:

- all young physicians
- non-NHSC M.D.s
- NHSC alumni
  - -- M.D.s
  - -- D.O.s
- Current PPOs
  - -- M.D.s
  - -- D.O.s

It is worth noting that the AMA provided the universe of physicians who meet the specified criteria. This means that NHSC and non-NHSC physicians are present. For the commmunity profiles analyses, we matched the AMA file with the NHSC alumni and current PPO files in order to identify and exclude NHSC physicians from the non-NHSC physician list.

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*Our original analysis plan indicated that data from the American Osteopathic Association also would be analyzed. The AOA, however, was unable to provide current addresses for a majority of 1974 to 1978 graduates of osteopathic schools.

The analysis of community characteristics in Stage 2 parallels the Stage 1 analysis. The complete list of community characteristics shown in Tables II.1 and II.2 is used and mean values of these characteristics calculated for the following categories of locations:

- o counties in which young physicians located and did not locate
- o counties in which NHSC alumni located and did not locate: total alumni, M.D. alumni, and D.O. alumni
- o counties in which current PPOs are serving and not serving: total PPOs, M.D. PPOs, and D.O. PPOs
- o counties in which all non-NHSC M.D.s located and did not locate

Table II.3 summarizes the definition of the variables used to stratify counties into gaining or not gaining categories.

The analysis of differences in community characteristics will focus on testing for significant differences, using a two-tailed t-test, in mean values of these characteristics for the following groups:

- o counties in which young physicians did and did not locate
- o counties in which non-NHSC physicians did and did not locate
- o counties in which NHSC alumni did and did not locate
- o counties in which current PPOs did and did not locate

These comparisons will be made for all rural counties, by Census Region, by county population size, and by HMSA status.

## D. DATA AND METHODOLOGY FOR THE MULTIVARIATE ANALYSIS OF COMMUNITY CHARACTERISTICS

### 1. Data

The Community Profiles Analysis permitted the identification of a reduced set of variables which were included in the community characteristics analysis. Table II.4 presents the variables which were examined in the multivariate analysis. All explanatory variables were constructed from data on the Area Resource File or the City and County Data

Book File. The dependent variables were constructed using the data provided by the AMA and AOA which have been described above.

## 2. Methodology

Since our primary interest was in determining the relationship between specific characteristics of communities and the probability that a county will attract young physicians, we have used LOGIT analysis. The qualitative dependent variable takes on the value of 1 for counties which attracted young physicians and 0 for counties which failed to gain a young physician. With a qualitative dependent variable, the appropriate and efficient analytic technique is LOGIT (Werner, Wendling, and Budde, 1978). A full discussion on multivariate log-linear and logistic models is provided in Nerlove and Press (1973) and in the SAS Logit Manual (1983).

Use of LOGIT analysis for the community characteristics analysis yields coefficients that can be examined for sign and significance of each variable as a factor influencing the probability that a county will have gained a young physician. In addition, each variable can be evaluated separately using the logistic transformation to determine the effect of that variable on the conditional probability that a county will attract a young physician. These conditional probabilities have the potential to be used to develop a system for classifying rural counties by probability of gaining a young physician.

TABLE II.1
COMMUNITY CHARACTERISTICS WHICH HAVE BEEN
IDENTIFIED AS INFLUENCING THE LOCATION DECISIONS OF PHYSICIAN

| Characteristics | Variable(s) | Source |
|---|---|---|
| Educational Quality | Expenditures per capita for public education | City and County Data Book |
| | Number of colleges and universities in county | Area Resource File |
| Health Resources | Number of nursing schools | Area Resource File |
| | Number of FTE RNS, P.A.s, NPS | Area Resource File |
| | Number of short term general and community hospitals | Area Resource File |
| | Number of short term general and community hospital beds | Area Resource File |
| | Neonatal ICU beds | Area Resource File |
| | Med/Surg ICU beds | Area Resource File |
| | Number of M.D. and D.O. physicians providing direct patient care services in county | Area Resource File |
| | Number of primary care M.D. and D.O. physicians providing direct patient care services in county | Area Resource File |
| | County M.D. and D.O. physician-to-population ratios | Area Resource File |
| | County primary care M.D. and D.O. physician-to-population ratios | Area Resource File |
| Economic Factors | County per capita income | Area Resource File |
| | County per household income | Area Resource File |
| | Percent growth in per capita income | Area Resource File |
| | County unemployment rate | Area Resource File |
| | Percent agricultural | Area Resource File |
| | Percent households below the poverty level | Area Resource File |
| | Percent persons below the poverty level | Area Resource File |
| | Occupied housing units | City and County Data Book |
| | Occupied housing units without plumbing | City and County Data Book |
| | Number AFDC recipients | Area Resource File |
| | Percent construction workers | Area Resource File |
| | Percent white collar workers | Area Resource File |
| | Percent manufacturing workers | Area Resource File |
| | Civilian labor force | City and County Data Book |
| | Local government expenditures for health and hospitals | City and County Data Book |
| | Per capita farm income | City and County Data Book |
| | Number of farms | City and County Data Book |

Table II.1 (continued)
Page Two

| Characteristics | Variable(s) | Source |
|---|---|---|
| Economic Factors (con't) | Percent farmland | City and County Data Book |
| | Resident work force | City and County Data Book |
| Population Characteristics | Total population, 1980 | Area Resource File |
| | Population growth rate, 1970-1980 | Area Resource File |
| | Population per square mile | Area Resource File |
| | Racial distribution | Area Resource File |
| | -- Percent white | |
| | -- Percent black | |
| | -- Percent Spanish descent | |
| | -- Percent other | |
| | Median school years, persons 25 years and older | Area Resource File |
| Climate and Recreational Opportunies | January temperature | Area Resource File |
| | July temperature | Area Resource File |
| | January precipitation | Area Resource File |
| | July percipitation | Area Resource File |
| | Elevation feet | Area Resource File |
| | Number of urban contigous counties | Area Resource File |
| Health Status of population | Total births | Area Resource File |
| | Infant mortality rate | Area Resource File |
| | Total deaths | Area Resource File |
| | Number of deaths due to infection and parasitic diseases | Area Resource File |
| | Number of deaths due to ischemic heart disease and other cariovascular disease | Area Resource File |
| Health Status of Population | Number of deaths due to influenza and pneumonia | Area Resource File |
| | Incidence of measles | Area Resource File |
| | Incidence of mumps | Area Resource File |
| | Incidence of rubella | Area Resource File |
| | Fertility rate | Area Resource File |
| Crime | Number of murders | Area Resource File |
| | Number of rapes | Area Resource File |
| | Number of burglaries | Area Resource File |
| Health Care Utilization | Hospital inpatient days | Area Resource File |
| | Hospital outpatient days | Area Resource File |
| | Hospital ER visits | Area Resource File |
| | Surgical operations | Area Resource File |

TABLE II.2
VARIABLE NAME AND DEFINITION

| NAME | DEFINITION |
|---|---|
| CENS80 | 1980 Census - total population |
| POPRT | % growth in population, 1970 - 1980 |
| PPSQM_75 | Persons per square mile |
| WHITE | % of population that is White |
| BLACK | % of population that is Black |
| SPANISH | % of population that is Spanish |
| OTHER | % of population that is another race |
| SCHOOL | Median school years for 25+ population |
| COLUNIV | # of colleges and other 4-year institutions |
| EDUCATE | Per capita expenditures for education |
| RNSCHL80 | # R.N. schools, 1979 - 1980 |
| FTERN77 | #FTE R.N.'s per 100,000 persons, 1977 |
| MDEXTRAT | # physician assistants and nurse prac. per 100,000, 1980 |
| HOSP82 | # General and community hospitals, 1982 |
| BED82 | # Beds, 1982 |
| BED82RAT | # Beds per 100,000 persons, 1982 |
| HEALTH | Per capita local health expenditures, 1982 |
| NEOBEDS | # Neonatal ICU beds per 100,000, general hospitals, 1982 |
| TOTMD80 | # M.D.'s providing patient care, 1980 |
| PC79 | # M.D.'s providing primary care, 1979 |
| MDPOP80 | # M.D.'s providing patient care per 100,000 person, 1980 |
| PCPOP79 | # M.D.'s providing primary care per 100,000 persons, 1979 |
| HOUSE | Per capita housing units, occupied, 1980 |
| TOTURBAN | # of urban contiguous counties, 1980 |
| TOILET | % houses lacking plumbing for E.U. |
| UNEMP | # unemployed persons/labor force = UR, 1982 |
| LABOR | Labor force participation rate,all persons, 1982 |
| INCPC77 | Per capita income, 1977 |
| HHINC75 | Average household income, 1975 |
| INCRATE | % growth in per capita income, 1975-1980 |
| PERPOVF | % of families below the poverty line |
| PERPOVP | % of persons below the poverty line |
| FARMPOP | % of labor force agricultural, 1980 |
| FARMINC | Per capita income for farm population, 1980 |
| FARMS | Number of farms, 1978 |
| FARMLAND | Farmland as % of total land, 1978 |
| AFDC79 | % AFDC recipients, 1979 |
| BUILDERS | % of workers in contruction, 1980 |
| WC80 | % white collar, 1980 |
| MNFTN680 | % manufacturing, 1980 |

Table II.2
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| NAME | DEFINITION |
|---|---|
| JANTEMP | January temperature, 1976, F° |
| JULYTEMP | July temperature, 1976, F° |
| JANRAIN | January rain, 1976, inches |
| JULYRAIN | July rain, 1976, inches |
| ALTITUDE | Elevation in feet |
| IMRATE | 5-yr infant mortality rate, 1974-78 |
| DEATHS79 | Total deaths per 100,000 persons, 1979 |
| DIE_IP77 | Total deaths per 100,000 persons due to infective/parasitic disease, 1979 |
| CDEATH79 | # cardiac deaths per 100,000 persons, 1979 |
| DIE_FL79 | # influenza/pneumonia deaths per 100,000 persons, 1979 |
| MEASLE79 | incidence of measles per 100,000 persons, 1979 |
| MUMPS79 | incidence of mumps per 100,000 persons, 1979 |
| RUBELA79 | incidence of rubela per 100,000 persons, 1979 |
| TEENBABY | % of births to teens, 1973-77 |
| MURDERS | # per 100,000 persons, 1975 |
| RAPES | # per 100,000 persons, 1975 |
| BURGLARY | # per 100,000 persons, 1975 |
| INPAT81 | # inpatient days/general hosp., per 100,000 pop., 1981 |
| OUTPAT81 | # outpatient days/general hosp., per 100,000 pop., 1981 |
| EMERG81 | # emergency outpatient visits/general hospital, per 100,000 pop., 1981 |
| ISURG80 | # inpatient surgical operations, per 100,000 pop., 1980 |
| TSURG80 | Total surgical operations, per 100,000 pop., 1980 |
| WORKERS | % of workers working in state/and county of residence, 1980 |
| WORKNRES | % working in state but not county of residence, 1980 |
| WORKOUT | % working outside of state of residence, 1980 |
| TOTDO81 | # D.O.'s, active non-fed patient care, 1981 |
| DOPOP81 | # D.O.'s, per 100,000 persons, 1981 |
| DO78_PR | # D.O.'s in primary care, 1978 |
| DOPOP_PR | # D.O.'s in primary care, per 100,000 persons, 1978 |
| MDINRE81 | # M.D. interns and residents, 1981 |
| FERT79 | Fertility rate, 1979 |

TABLE II.3
STAGE 2 DEPENDENT VARIABLE DEFINITIONS

The tables produced by the SAS Procedure TTest contain independent variable means and t-tests for significant difference of means on two-level dependent variables. The names and definitions of these dependent variables remain constant and are as follow:

| | |
|---|---|
| ATTRACTA | Attract status for all young physicians excluding current PPO's.<br>If ALLYOUNG = 0 then ATTRACTA = 0;<br>else ATTRACTA = 1; |
| ATTRACTB | Attract status for all NHSC alumni.<br>If TOTALUM = 0 then ATTRACTB = 0<br>else ATTRACTB = 1; |
| ATTRACTC | Attract status for NHSC alumni who are M.D.s.<br>If ALUM_MD = 0 then ATTRACTC = 0;<br>else ATTRACTC = 1; |
| ATTRACTD | Attract status for NHSC alumni who are D.O.s.<br>If ALUM_DO = 0 then ATTRACTD = 0<br>else ATTRACTD = 1; |
| ATTRACTE | Attract status for all current PPO's.<br>If TOTPPO = 0 then ATTRACTE = 0;<br>else ATTRACTE = 1; |
| ATTRACTF | Attract status for current PPO's who are M.D.s.<br>If PPOMD-A = 0 then ATTRACTF = 0<br>else ATTRACTF = 1; |
| ATTRACTG | Attract status for current PPO's who are D.O.s.<br>If PPODO-A = 0 then ATTRACTG = 0<br>else ATTRACTG = 1; |
| ATTRACTH | Attract status for all non-NHSC M.D.s.<br>If AMA-TOT = 0 then ATTRACTH = 0<br>else ATTRACTH = 1. |

TABLE II.4

VARIABLES USED IN MULTIVARIATE
COMMUNITY CHARACTERISTICS ANALYSIS

| | | |
|---|---|---|
| | | **Dependent Variables** |
| ANYDOC | = | 1, if any young physician located in the county; 0, otherwise |
| NONNHSC | = | 1, if any young non-NHSC alumni located in the county; 0, otherwise |
| NHSCLOC | = | 1, if any young NHSC alumni located in the county; 0, otherwise |
| | | **Explanatory Variables** |
| AMA2 | = | 1, if the county has 10,000 - 24,999 population and is not in an SMSA; 0, otherwise |
| AMA3 | = | 1, if the county has 25,000 - 49,999 population and is not in an SMSA; 0, otherwise |
| PPSQM75 | = | County population per square mile in 1975 |
| EDUCATE | = | County expenditures on public education per capita |
| COLLEGE | = | 1, if there is a 2 year or 4 year college in the county; 0, otherwise |
| URBAN | = | 1, if the county is contiguous to an SMSA; 0, otherwise |
| INCRATE | = | Percentage increase in per capita income in county, 1975 - 1980 |
| WC80 | = | Percentage of population with white collar employment, 1980 |
| FARMPOP | = | Percentage of population residing on farms, 1980 |
| PERPOVF | = | Percentage of population with incomes below the poverty level, 1980 |
| WORKRES | = | Percentage of the employed population which works in the county of residence |
| HOSPITAL | = | 1, if there is a hospital in the county; 0, otherwise |

TABLE II.4 (continued)

| | | |
|---|---|---|
| MDPOP | = | Physicians - to - 100,000 population ratio in county |
| HMSA1 | = | 1, if the county is a wholly - designated HMSA; 0, otherwise |
| HMSA2 | = | 1 if the county is a partially - designated HMSA; 0, otherwise. |

## III. FINDINGS: STAGE 1 ANALYSIS

### A. DISTRIBUTIONAL PATTERNS

Table III.1 presents summary data on the change in the supply of young physicians in all nonmetropolitan counties between 1975 and 1979, and by region, county population size, and HMSA status. Of 2111 nonmetropolitan counties, 40 percent attracted one or more young physicians, 42 percent exhibited no change in the supply of young physicians, and 18 percent lost one or more young physicians. This distribution varies considerably, however, when the counties are stratified by region, population size, and HMSA status.

The North Census Region has had the most success in attracting young physicians over the period of interest; over 65 percent of its nonmetropolitan counties gained one or more young physicians. Counties in the Central Region, on the other hand, were least likely to have gained a young physician--only 35 percent of these 794 counties attracted a new physician between 1975 and 1979. The South and West Regions were nearly equally successful in attracting young physicians; 41 percent and 43 percent of counties, respectively, gained one or more new physicians. The distributions indicate relative attractiveness but do not reflect actual flows of young physicians by region. The North Region had only 39 counties which gained young physicians, while the Central Region had 278 counties which gained one or more young physicians.

When nonmetropolitan counties are stratified by population size, a distinctive pattern emerges--least populous counties are least likely to have gained (21 percent) a young physician, most likely to have exhibited no change (65 percent) in the supply of young physicians, and least likely to have lost a young physician (14 percent). The most populous nonmetropolitan counties are most likely to have gained a young physician (61 percent), least likely to have exhibited no change in supply (16 percent), and most likely to have lost one or more young physicians (23 percent). These findings are consistent with previous findings in the literature, i.e. if diffusion is occurring, young physicians are locating in the most desirable nonmetropolitan areas in increasing numbers. In terms of population base and attractiveness of environment, it is reasonable to expect that young physicians will locate in more populous areas up to a saturation point and then in the less populous areas.

Examination of the distributional patterns by county HMSA pattern reveals that counties which are in part designated as Health Manpower Shortage Areas are more likely to have attracted a young physician than are counties which are not HMSA-designated. Not unexpectedly, HMSA counties which are wholly designated are least likely to have gained a young physician.

The discussion in this section has focused primarily on describing the distribution of counties which have experienced a net gain in young

physicians. It is important to recognize that the categories "no change" and "net loss" are not interpretable in a straightforward fashion. Counties which "lost" young physicians may have actually lost a physician or may have retained a physician who aged into an older age category. Similarly, counties which we have classed as "no change" may have experienced a stable physician supply or may have attracted one or more young physicians who replaced others who aged into the next age category or who moved out of the area. To examine one possibility, we calculated the percentage of "No Change" counties which had no physician under 35 in both 1975 and 1979. Of all 895 counties in this category, 641 or 72 percent had no young physician in either 1975 or 1979. This varies, however, by different classes of counties.

| Region | Percent of "No Change" Counties with No Young M.D.s |
|---|---|
| North | 33% |
| Central | 74 |
| South | 70 |
| West | 74 |
| **Population Size** | |
| Under 10,000 | 89% |
| 10,000 - 24,999 | 58 |
| 25,000 and over | 23 |
| **HMSA Status** | |
| Non HMSA | 60% |
| Part HMSA | 53 |
| Whole HMSA | 84 |

Clearly, there are areas of the country and types of counties which are more (or less) likely to have gained young physicians. The high proportion of counties which had no young physician in either year suggests that there remains a "core" of counties which have been and have continued to be unattractive to young physicians.

B. RELATIONSHIP OF CHANGE IN UNDER 35 PHYSICIAN SUPPLY AND CHANGE IN TOTAL PHYSICIAN SUPPLY, 1975-1979

Table III.2 displays the relationship of changes in the supply of physicians under age 35 to changes in the total supply of physicians between 1975 and 1979. Sixty percent of counties which gained one or more young

physician experienced an overall increase in total supply of physicians. In the remaining 40 percent of counties, the addition of one or more young physicians offset, partly or completely, a loss of older physicians--possibly to retirement or death.

Examination of counties for which no change in the supply of young physicians was found reveals that no change in the total supply of physicians was observed in 65 percent of these counties. Presumably, any young physicians locating in these counties offset physicians aging into the older age groups and physicians who retire or die. In the 19 percent of counties which gained in total supply of physicians, it must be assumed that one or more "older" physicians was attracted to the area. Finally, in 17 percent of counties which evidenced no increase in the supply of young physicians there was a net loss in the total supply of physicians. In these counties it may be reasonable to presume that older physicians retired, migrated, or died and were not replaced by younger physicians.

It is particularly interesting to look at the group of counties which are reported to have lost young physicians between 1975 and 1979. Of these, fully 51 percent experienced no change in the total supply of physicians--suggesting that the "Net Loss" may only reflect the aging of under age 35 physicians into an older age group. However, it is also of note that the "Net Loss" category is also most likely to have experienced a loss in total supply of physicians. Thus, it is possible that some of these counties may have lost young physicians who have migrated to other--more attractive--areas.

Overall, the data in Table III.2 suggest that there is a strong relationship between changes in the supply of young physicians and changes in the total supply of physicians in an area. However, it is also evident that the actions of older physicians affect total supply. In this limited study, we are not able to fully examine these issues.

## C. EXAMINATION OF THE DISTRIBUTION OF COUNTIES WITH NET GAINS OF YOUNG PHYSICIANS BY THE NUMBER GAINED

In addition to identifying counties which have successfully attracted young physicians, it is of interest to examine the distribution of these counties by the number of young physicians attracted. Table III.3 summarizes these distributions. Among all counties which experienced a net gain in young physicians between 1975 and 1979, 69 percent gained 1 or 2 physicians, 18 percent gained 3 to 4, and 14 percent gained 5 or more. Clearly, the overwhelming majority of counties gained only a small number of young physicians. There is, however, substantial variation when the number of young physicians gained is examined by region, population, and HMSA status.

The North and West Region counties have a much higher likelihood of having attracted larger numbers of young physicians per county. In the North Region, 62 percent of counties with a gain added 3 or more young physicians; in the West this proportion is 46 percent. On the other hand,

in both the Central and West Regions, nearly three-quarters of counties with a net gain attracted only 1 to 2 young physicians.

When counties with net gains are stratified by population, a strong relationship between population size and the number of young physicians attracted is evident. Counties with less than 10,000 population are highly unlikely to have gained more than two young physicians; only 12 percent gained 3 to 4; and none added more than 4. Among counties with 10,000 to 25,000 population, 76 percent attracted only 1 to 2 young physicians; 17 percent gained 3 to 4; and 7 percent added 5 or more. By contrast, non-metropolitan counties with over 25,000 population were more likely to gain a higher number of young physicians; 53 percent added 3 or more young physicians between 1975 and 1979.

When counties which gained young physicians are examined by HMSA status, the group most likely to have added 3 or more young physicians is the "Partial HMSA" group (43 percent). Non-HMSAs gained 3 or more young physicians in only 36 percent of counties. Full county HMSAs were least likely to have attracted more than 1 or 2--only 15 percent of counties were in this category. While the latter finding is consistent with prior expectations, it is unclear why counties which are partly designated as Health Manpower Shortage Areas are able to attract higher numbers of young physicians. Further examination of the characteristics of counties in this group will focus on this issue.

## D. CHARACTERISTICS OF COMMUNITIES WITH NET GAINS, NO CHANGE, AND NET LOSSES OF YOUNG PHYSICIANS, 1975 TO 1979

The means of characteristics of counties which gained, experienced no change, and lost young physicians as described above in the section on methodology, are shown in Table III.4(a) for all nonmetropolitan counties. Examination of these data and of significant differences between counties with net gains and net losses of young physicians yields a number of findings:

- o Population is a distinguishing characteristic of counties which gained young physicians; both average population and population growth rate is higher in counties which gained young physicians. Educational level population density, and racial mix of the population does not differentiate counties with net gains from those with losses.

- o Health resources available to a community distinguishes counties which gained young physicians from those which did not. Counties which gained have significantly more R.N.'s, R.N. schools, hospital beds, neonatal ICU beds, medical-surgical ICU beds, physicians, and physicians-to-population.

- o Economic factors fail to distinguish gainers from losers. There are not significant differences in per capita income, household income, unemployment rate, or percent of families or persons below the poverty line. However, the average rate of increase in per capita income is significantly higher in counties which gained young physicians. In addition the percent of the county in agriculture is significantly different between gaining and losing counties--with gainers less likely to be agricultural.

- o Climate/environmental factors fail to distinguish gaining from losing counties.

- o Health status measures also fail to distinguish gainers and losers, with the exception of "total deaths." This variable, however, is not a rate and merely reflects differences in population size between the two groups.

- o Crime variables exhibit mixed associations. While there are not significant differences in the number of violent crimes committed in gaining and losing counties, significantly more burglaries occur in gaining counties.

These findings for all nonmetropolitan counties are of interest and, in most respects, consistent with prior findings which suggest that population and health resources are related to the attractiveness of an area to young physicians. However, it is possible that aggregation may obscure important differences among regions or population categories in factors which attract young physicians. Therefore, we examine in Tables III.4(b) through 4(d) the mean community characteristics of gaining and losing counties by Census Region, population size, and HMSA status.

Examination of the means of characteristics of counties by Census Region (Table III.4(b)) results in a number of interesting observations:

- o No characteristics distinguish gaining and losing counties in the North Region. However, only 60 counties fall within this category.

- o Population is a key distinguishing characteristic for the Central, South, and West Regions; in all cases, gaining counties are more populous than losing counties. "Population growth rate" is significant only for the West Region. "Median years of schooling" is significant in the South and West Regions; however, differences in the means are very small.

- o Economic variables fail to distinguish gaining and losing counties in all regions except "Percent Households Below Poverty Line" and "Percent Persons Below Poverty Line" in the South Region.

- o Health resources are the most consistent variables distinguishing gainers and losers in the Central, South, and West Regions. Physician supply variables are significant, as are hospital bed supply, R.N. supply, and ICU beds, for most areas.

- o Environment, health status, and crime variables perform weakly or not at all in distinguishing gaining and losing counties.

Overall, there appears to be few differences by Census Region in the characteristics of counties associated with gaining and losing young physicians.

When the characteristics of counties are examined for counties grouped by population size (Table III.4(c)), the effect of population size as a distinguishing variable is essentially eliminated. Characteristics of counties which are associated with gaining and losing young physicians, when population is accounted for, include:

- o Physician supply is a distinguishing characteristic for all county population classes; however, other health resources variables perform erratically--none are significant in the smallest counties, while nurse supply and ICU beds are distinguishing characteristics for more populous areas.

- o Economic variables continue to be nonsignificant with the exception of the "Growth Rate in Per Capita Income" in more populous areas.

- o Environmental variables continue to be nonsignificant with one exception--in more populous counties, areas at higher elevations are more likely to have gained physicians.

- o Health status variables do not distinguish gainers and losers within county population groups with the exception of the "Incidence of Mumps" in the smallest counties.

- o Crime indicators do distinguish, for the least and most populous areas, net gainers from net losers; however, the direction of the relationship is contrary to expectations.

When means of characteristics of counties are calculated for counties grouped by HMSA status (Table III.4(d)), several findings of interest are noted:

- o Population and "Population Growth Rate" are distinguishing characteristics for non-HMSA counties, but fail to be significant for whole and part HMSA counties.
- o Economic variables are, for the most part, not distinguishing characteristics with the exception of "Percent Agricultural" in the non-HMSA and part HMSA counties, and "Growth Rate of Per Capita Income" in the non-HMSA counties.
- o Environment variables are not significant for any group.
- o Health status and crime variables perform erratically with no evident pattern emerging.
- o Health resources are the most consistent variables for distinguishing gaining and losing counties, regardless of HMSA status.

## E. DISCUSSION

The Stage 1 analysis is limited in scope due to the fact that our data source permits only flows of young and total physicians to be examined. We are unable to distinguish individual location decisions using this approach and, thus, findings should be viewed as primarily providing direction for the Stage II analysis which does rely on individual physician data.

The findings of this study were used to refine and guide the Stage II analysis. Information on the location choices of all primary care physicians (M.D.s) who graduated from medical school between 1974 and 1978 and who are currently in nonmetropolitan areas has been obtained from the American Medical Association. From the National Health Service Corps Files, we are able to identify those 1974 through 1978 medical school graduates who served in the NHSC. Similarly, the current NHSC Private Practice Option File can be used to identify physicians currently serving in the NHSC. The fact that we have data on the specific location decisions of all young physicians, by NHSC current and past service type, permits a much more detailed and comprehensive examination of community characteristics and their relationship to young physicians' location choices. Findings of this Stage II analysis are reported in Chapter IV.

TABLE III.1

DISTRIBUTION OF NON-METROPOLITAN COUNTIES BY CHANGE IN THE SUPPLY OF NON-FEDERAL PHYSICIANS UNDER AGE 35, 1975 TO 1979

| Change in Young Physician Supply | All Non-Metropolitan Counties | Region | | | | County Population | | | HMSA Status | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | North | Central | South | West | Under 10,000 | 10,000 -25,000 | Over 25,000 | Non-HMSA | Whole HMSA | Part HMSA |
| Net Gain | 40.0 | 65.0 | 35.0 | 41.0 | 43.0 | 21.0 | 44.0 | 61.0 | 43.0 | 31.0 | 51.0 |
| No Change | 42.0 | 15.0 | 45.0 | 41.0 | 44.0 | 65.0 | 37.0 | 16.0 | 37.0 | 54.0 | 28.0 |
| Net Loss | 18.0 | 20.0 | 20.0 | 18.0 | 14.0 | 14.0 | 19.0 | 23.0 | 20.0 | 15.0 | 21.0 |
| Total | | | | | | | | | | | |
| Percent | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Number | 2111 | 60 | 794 | 968 | 289 | 739 | 909 | 463 | 878 | 836 | 397 |

TABLE III.2

COMPARISON OF CHANGES IN UNDER AGE 35 PHYSICIAN SUPPLY AND CHANGES IN TOTAL NON-FEDERAL PHYSICIAN SUPPLY, 1975 TO 1979

| Change in Supply of Young Physicians | Change in Total Supply of Physicians | | |
|---|---|---|---|
| | Gain | No Change | Loss |
| Net Gain | | | |
| 100.0% | 60.0 | 27.0 | 0.13 |
| (1096) | (656) | (293) | (147) |
| No Change | | | |
| 100.0% | 19.0 | 65.0 | 0.17 |
| (615) | (114) | (399) | (102) |
| Net Loss | | | |
| 100.0% | 0.16 | 51.0 | 0.33 |
| (401) | (64) | (203) | (134) |

TABLE III.3

DISTRIBUTION OF COUNTIES WITH NET GAINS BY THE NUMBER OF YOUNG NON-FEDERAL PHYSICIANS GAINED, 1975 TO 1979

| Number of Young Physicians Gained | All Counties With Net Gains | Region | | | | County Population | | | HMSA Status | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | North | Central | South | West | Under 10,000 | 10,000 -25,000 | Over 25,000 | Non-HMSA | Whole HMSA | Part HMSA |
| 1-2 | 69.0% | 38.0 | 73.0 | 73.0 | 54.0 | 88.0% | 76.0% | 47.0% | 64.0 | 85.0 | 57.0 |
| 3-4 | 18.0 | 23.0 | 15.0 | 18.0 | 24.0 | 12.0 | 17.0 | 22.0 | 22.0 | 11.0 | 20.0 |
| 5-6 | 8.0 | 18.0 | 9.0 | 4.0 | 15.0 | 0.0 | 5.0 | 17.0 | 9.0 | 2.0 | 14.0 |
| 7 or more | 6.0 | 21.0 | 4.0 | 5.0 | 7.0 | 0.0 | 2.0 | 14.0 | 6.0 | 2.0 | 9.0 |

## TABLE III.4(a)

MEAN COMMUNITY CHARACTERISTICS OF COUNTIES WITH NET GAINS, NO CHANGE, AND NET LOSSES OF YOUNG NON-FEDERAL PHYSICIANS, 1975 TO 1979

| Characteristics | Change in Supply of Young Physicians | | |
|---|---|---|---|
| | Net Gain | No Change | Net Loss |
| **Population** | | | |
| Population | 21,873.00* | 11,978.00 | 19,484.00* |
| Population Growth Rate | 14.80* | 11.20 | 12.30* |
| Percent White | 88.09 | 88.86 | 89.11 |
| Percent Black | 8.87 | 7.87 | 8.51 |
| Percent Spanish | 3.41 | 4.52 | 3.42 |
| Median School Years | 11.48 | 11.33 | 11.39 |
| Population Per Square Mile | 34.55 | 20.80 | 33.91 |
| **Cultural** | | | |
| Number Colleges and Universities | 0.18 | 0.05 | 0.19 |
| **Economic** | | | |
| Per Capita Income | $3447.80 | $3297.10 | $3443.70 |
| Household Income | $11,377.00 | $11,043.80 | $11,367.50 |
| Growth Rate of Per Capita Income | 60.62* | 59.81 | 58.50* |
| Unemployment Rate | 7.33 | 6.91 | 7.93 |
| Percent Agricultural | 13.40* | 19.98 | 15.29* |
| Percent Households Below Poverty Line | 13.21 | 14.83 | 13.82 |
| Percent Persons Below Poverty Line | 16.70 | 18.41 | 17.30 |
| **Health Resources** | | | |
| Number of R.N. Schools | 0.13* | 0.02 | 0.09* |
| Number of FTE R.N.s | 141.80* | 88.70 | 123.00* |
| Number of Physician Extenders per 100,000 Population | 5.20 | 4.40 | 4.70 |
| Number of Hospitals | 2.50 | 1.80 | 2.40 |
| Number of Hospital Beds | 194.90* | 89.80 | 167.50* |
| Number of Neonatal ICU Beds | 0.10* | 0.00 | 0.01* |
| Number of Medical Surgical ICU Beds | 2.09* | 0.86 | 1.55* |
| Total Number of M.D.s | 15.69* | 5.14 | 11.77* |
| Number of Primary Care M.D.s | 8.78* | 3.43 | 6.81* |
| M.D.s-to-100,000 Population | 67.26* | 37.02 | 53.82* |
| Primary Care MDs to 100,000 Population | 40.79* | 27.18 | 34.42* |
| **Environment** | | | |
| January Temperature | 32.02 | 32.26 | 31.43 |
| July Temperature | 75.56 | 76.31 | 75.60 |
| January Precipitation | 2.51 | 2.18 | 2.48 |
| July Precipitation | 3.65 | 3.51 | 3.68 |
| Elevation in Feet | 1373.80 | 1576.60 | 1280.90 |
| **Health Status** | | | |
| Fertility Rate | 7.44 | 7.80 | 7.59 |
| Infant Mortality Rate | 156.81 | 196.18 | 152.91 |
| Total Deaths | 210.28* | 121.32 | 191.81* |
| Deaths from Infective/Parasitic Diseases | 7.25 | 6.24 | 7.11 |
| Deaths from Influenza/Pneumonia | 28.97 | 25.21 | 27.61 |
| Deaths from Cardio-Vascular Conditions | 509.29 | 343.27 | 531.46 |
| Incidence of Measles | 6.88 | 5.03 | 6.53 |
| Incidence of Mumps | 9.63 | 6.36 | 8.86 |
| Incidence of Rubella | 5.39 | 3.41 | 5.30 |
| **Crime** | | | |
| Number of Murders | 5.30 | 4.48 | 5.36 |
| Number of Rapes | 7.61 | 5.91 | 6.56 |
| Number of Burglaries | 580.85* | 461.30 | 502.97* |

*Difference is significant at the $p < .05$ level, using a two-tailed t-test.



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## TABLE III.4 (b)

MEAN CHARACTERISTICS OF COUNTIES WITH NET GAINS, NO CHANGE, AND NET LOSSES OF YOUNG NON-FEDERAL PHYSICIANS, BY REGION, 1975 TO 1979

| Characteristics | Northern Counties | | | Central Counties | | | Southern Counties | | | Western Counties | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gain | No Change | Loss | Gain | No Change | Loss | Gain | No Change | Loss | Gain | No Change | Loss |
| **Population** | | | | | | | | | | | | |
| Population | 30,196.31 | 21,864.22 | 35,211.17 | 21,721.98* | 11,148.31 | 19,004.53* | 22,143.23* | 13,784.92 | 20,048.36* | 18,396.21* | 7,901.69 | 14,192.07* |
| Population Growth Rate | 14.66 | 10.29 | 15.51 | 6.00 | 3.72 | 6.27 | 15.78 | 14.14 | 15.57 | 32.46* | 23.25 | 21.78* |
| Percent White | 98.84 | 99.49 | 98.74 | 96.60* | 98.66 | 98.27* | 79.82 | 79.82 | 79.75 | 91.75 | 94.62 | 90.96 |
| Percent Black | 0.48 | 0.20 | 0.69 | 0.96 | 0.50 | 0.62 | 17.99 | 17.06 | 17.99 | 0.54 | 0.17 | 0.61 |
| Percent Spanish | 0.49 | 0.32 | 0.59 | 0.88* | 0.71 | 0.61* | 3.77 | 6.93 | 4.41 | 8.91 | 7.98 | 10.97 |
| Median School Years | 12.00 | 12.00 | 12.00 | 11.91 | 11.85 | 11.92 | 10.86* | 10.63 | 10.64* | 12.18* | 12.05 | 12.00* |
| Population Per Sq. Mile | 47.59 | 39.00 | 51.08 | 34.76 | 19.38 | 32.10 | 40.13 | 26.71 | 38.95 | 12.08 | 4.79 | 10.15 |
| **Cultural** | | | | | | | | | | | | |
| Number Colleges, Universities | 0.38 | 0.11 | 0.75 | 0.24 | 0.05 | 0.21 | 0.13 | 0.04 | 0.14 | 0.12 | 0.02 | 0.10 |
| **Economic** | | | | | | | | | | | | |
| Per Capita Income | $5,362.33 | $5,334.33 | $5,605.58 | $5,895.83 | $5,622.22 | $5,950.90 | $4,972.05 | $4,895.51 | $4,898.16 | $5,982.93 | $5,652.80 | $5,773.40 |
| Household Income | $12,166.13 | $11,890.67 | $12,591.42 | $12,306.49 | $11,989.24 | $12,522.05 | $10,335.88 | $9,936.84 | $10,072.21 | $12,345.25 | $11,812.65 | $12,100.40 |
| Growth Rate Per Capita Income | 60.28 | 59.23 | 57.63 | 53.82* | 49.09 | 49.85* | 64.85 | 66.88 | 65.35 | 62.61 | 65.49 | 62.88 |
| Unemployment Rate | 8.88 | 9.81 | 8.48 | 5.72 | 5.02 | 5.77 | 6.57 | 6.48 | 6.95 | 7.97 | 6.47 | 8.01 |
| Percent Agricultural | 7.20 | 7.32 | 6.07 | 15.29 | 23.62 | 16.96 | 11.66 | 15.44 | 12.97 | 16.67* | 24.95 | 21.62* |
| Percent Household Below Poverty Level | 9.96 | 9.38 | 8.66 | 10.27 | 12.59 | 10.03 | 16.54* | 17.88 | 18.08* | 10.24 | 11.86 | 11.74 |
| Percent Persons Below Poverty Line | 13.17 | 12.78 | 11.67 | 13.33 | 15.74 | 12.82 | 20.51* | 22.01 | 22.31* | 13.31 | 14.99 | 14.76 |
| **Health Resources** | | | | | | | | | | | | |
| Number of RN Schools | 0.05 | 0.00 | 0.00 | 0.19* | 0.03 | 0.05* | 0.10 | 0.02 | 0.11 | 0.07 | 0.02 | 0.13 |
| Number of FTE RNs | 256.34 | 102.13 | 177.01 | 172.89* | 101.65 | 150.42* | 107.00* | 68.59 | 90.52* | 145.78 | 100.92 | 139.10 |
| Number Physician Extenders per 100,000 Population | 11.87 | 7.23 | 8.77 | 5.26* | 5.91 | 3.64* | 3.08* | 2.79 | 4.04* | 9.94 | 5.92 | 6.75 |
| Number of Hospitals | 2.77 | 1.33 | 3.58 | 2.64 | 1.68 | 2.58 | 2.35 | 1.62 | 2.19 | 2.72* | 1.52 | 2.17* |
| Number of Hospital Beds | 265.79 | 153.56 | 311.17 | 225.14* | 85.74 | 185.24* | 181.03* | 92.06 | 154.71* | 148.45* | 61.48 | 110.15* |
| Number of Neonatal ICU Beds | 0.36 | 0.00 | 0.00 | 0.16* | 0.00 | 0.01* | 0.04 | 0.00 | 0.00 | 0.08 | 0.00 | 0.00 |
| Number of Medical Surgical ICU Beds | 3.38 | 1.11 | 3.75 | 2.41 | 0.75 | 1.78 | 1.85* | 0.67 | 1.23* | 1.46 | 0.33 | 1.39 |
| Total Number of MDs | 31.31 | 15.96 | 31.83 | 15.85* | 4.67 | 11.24* | 14.00* | 5.67 | 10.99* | 15.80 | 4.07 | 11.42 |
| Number of Primary Care MDs | 14.97 | 7.36 | 14.25 | 9.20* | 3.27 | 7.12* | 7.89* | 3.75 | 6.23* | 8.68* | 2.56 | 5.88* |
| MDs-to-100,00 Population | 119.63 | 59.88 | 86.42 | 66.62* | 36.10 | 55.65* | 58.73* | 34.82 | 48.55* | 79.36* | 45.00 | 59.79* |
| Primary Care MD-to-100,000 Population | 55.82 | 36.45 | 37.92 | 42.84* | 27.43 | 37.92* | 35.63* | 25.45 | 30.14* | 47.89* | 31.30 | 38.23* |
| **Environment** | | | | | | | | | | | | |
| January Temperature | 22.11 | 24.67 | 21.98 | 21.60 | 22.62 | 21.96 | 42.04 | 43.49 | 41.66 | 28.77 | 24.87 | 27.18 |
| July Temperature | 69.08 | 69.34 | 70.33 | 73.89 | 74.63 | 73.86 | 79.35 | 80.21 | 79.11 | 69.29 | 69.18 | 69.80 |
| January Precipitation | 2.69 | 2.71 | 2.47 | 1.35 | 1.17 | 1.46 | 3.49 | 3.31 | 3.54 | 1.94 | 1.40 | 1.88 |
| July Precipitation | 3.68 | 3.93 | 3.62 | 3.61 | 3.42 | 3.35 | 4.47 | 4.33 | 4.42 | 1.13 | 1.12 | 0.99 |
| Elevation in Feet | 696.18 | 1,127.11 | 711.00 | 1,180.77 | 1,429.43 | 1,149.50 | 740.50 | 845.00 | 836.84 | 4,063.63 | 4,350.63 | 3,995.82 |
| **Health Status** | | | | | | | | | | | | |
| Fertility Rate | 6.65 | 6.51 | 6.35 | 7.94 | 8.33 | 7.76 | 7.42 | 7.64 | 7.61 | 8.74* | 8.77 | 9.60* |
| Infant Mortality Rate | 125.36 | 131.11 | 124.08 | 139.41 | 137.42 | 133.07 | 179.75 | 181.29 | 176.68 | 146.50 | 131.53 | 135.97 |
| Total Deaths | 984.60 | 1,035.35 | 924.85 | 1,035.45* | 1,114.16 | 1,076.76* | 1,014.19 | 1,016.59 | 1,018.62 | 802.89 | 843.22 | 848.37 |
| Deaths from Infective/ Parasitic Diseases | 7.05 | 5.85 | 5.95 | 5.59 | 5.03 | 5.43 | 8.99 | 7.63 | 9.42 | 5.49 | 5.40 | 3.93 |
| Deaths from Influenza/Pneumonia | 21.91 | 23.28 | 21.69 | 31.31 | 29.88 | 27.77 | 26.20 | 22.91 | 28.85 | 21.20 | 19.38 | 23.33 |
| Deaths from Cardio-Vascular Conditions | 507.88 | 548.88 | 490.21 | 554.48* | 613.57 | 589.47* | 522.10 | 527.37 | 518.45 | 366.29 | 393.71 | 372.75 |
| Incidence of Measles | 9.03 | 0.00 | 19.37 | 9.52 | 4.27 | 12.48 | 5.63* | 5.37 | 1.36* | 4.21 | 6.49 | 1.81 |
| Incidence of Mumps | 5.73 | 3.77 | 2.70 | 7.43* | 5.97 | 2.20* | 13.83 | 6.92 | 12.01 | 2.40 | 5.84 | 2.07 |
| Incidence of Rubella | 7.16 | 0.00 | 4.44 | 9.22 | 4.28 | 7.81 | 2.91 | 1.69 | 2.10 | 4.10 | 6.69 | 11.60 |
| **Crime** | | | | | | | | | | | | |
| Number of Murders | 1.23 | 6.89 | 2.44 | 2.16 | 1.79 | 2.41 | 8.02 | 6.76 | 7.73 | 5.05 | 4.68 | 7.45 |
| Number of Rapes | 6.28 | 3.98 | 7.30 | 5.41 | 5.09 | 4.56 | 8.20 | 5.87 | 7.34 | 11.10 | 8.52 | 10.83 |
| Number of Burglars | 783.72 | 1,483.47 | 806.40 | 632.37 | 473.43 | 549.05 | 476.88* | 345.48 | 387.85* | 799.67 | 722.28 | 731.87 |

*Difference is significant at the $p < .05$ level, using a two-tailed t-test.





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## TABLE III.4 (c)

MEAN CHARACTERISTICS OF COUNTIES WITH NET GAINS, NO CHANGE, AND NET LOSSES OF YOUNG NON-FEDERAL PHYSICIANS, BY COUNTY POPULATION SIZE, 1975 TO 1979

| County Characteristics | County Population Under 10,000 | | | 10,000-24,999 | | | 25,000 and Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | Gain | No Change | Loss | Gain | No Change | Loss | Gain | No Change | Loss |
| **Population** | | | | | | | | | |
| Population | 7097.00 | 5608.00 | 6824.00 | 17,619.42 | 16,043.92 | 17,774.34 | 35,881.65 | 34,644.79 | 34,786.98 |
| Population Growth Rate | 13.10 | 8.30 | 8.30 | 15.34 | 13.29 | 14.50 | 15.34 | 16.72 | 12.68 |
| Percent White | 90.64 | 90.29 | 90.99 | 86.94 | 87.08 | 88.95 | 88.30 | 87.62 | 87.54 |
| Percent Black | 4.88 | 5.63 | 6.20 | 9.77 | 10.69 | 8.79 | 9.77 | 9.81 | 10.31 |
| Percent Spanish | 4.07 | 5.29 | 5.13 | 3.98 | 3.60 | 3.61 | 2.25 | 3.70 | 1.41 |
| Median School Years | 11.40 | 11.43 | 11.47 | 11.35 | 11.15 | 11.22 | 11.85* | 11.39 | 11.45* |
| Population Per Square Mile | 14.89 | 10.36 | 12.34 | 29.49 | 28.09 | 29.35 | 52.45* | 55.41 | 61.22* |
| **Cultural** | | | | | | | | | |
| Number Colleges and Universities | 0.03 | 0.01 | 0.04 | 0.11 | 0.08 | 0.18 | 0.35 | 0.21 | 0.37 |
| **Economic** | | | | | | | | | |
| Per Capita Income | $5,347.40 | $5,334.40 | $5,464.77 | $5,388.17 | $5,196.31 | $5,208.61 | $5,383.95 | $5,509.24 | $5,818.30 |
| Household Income | $10,971.48 | $11,174.68 | $11,334.58 | $11,191.30 | $10,783.88 | $11,057.14 | $11,858.31 | $11,389.15 | $11,917.19 |
| Growth Rate of Per Capita Income | 58.38 | 59.95 | 59.15 | 60.28 | 59.06 | 57.88 | 62.32* | 62.32 | 58.89* |
| Unemployment Rate | 6.62 | 5.86 | 6.68 | 7.53 | 7.81 | 8.23 | 8.02 | 9.60 | 8.64 |
| Percent Agricultural | 20.45 | 25.95 | 22.04 | 13.45 | 14.48 | 13.96 | 9.50 | 8.79 | 10.89 |
| Percent Households Below Poverty Line | 14.25 | 15.18 | 14.34 | 13.97 | 14.67 | 14.38 | 11.57 | 13.20 | 12.41 |
| Percent Persons Below Poverty Line | 17.84 | 18.77 | 17.70 | 17.53 | 18.29 | 17.93 | 14.92 | 16.71 | 15.84 |
| **Health Resources** | | | | | | | | | |
| Number of R.N. Schools | 0.03* | 0.00 | 0.00* | 0.08 | 0.03 | 0.05 | 0.25 | 0.15 | 0.23 |
| Number of FTE R.N.s | 113.00 | 84.87 | 115.84 | 129.18* | 80.52 | 109.79* | 174.75 | 126.86 | 158.79 |
| Number of Physician Extenders per 100,000 Population | 7.35 | 5.14 | 5.40 | 4.94 | 3.46 | 4.30 | 4.38 | 3.49 | 4.25 |
| Number of Hospitals | 1.35 | 1.19 | 1.75 | 2.34 | 1.92 | 2.23 | 3.30 | 2.73 | 3.17 |
| Number of Hospital Beds | 63.55 | 44.85 | 70.04 | 148.24 | 103.61 | 142.76 | 330.55 | 269.88 | 304.23 |
| Number of Neonatal ICU Beds | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 0.01 | 0.20* | 0.00 | 0.00* |
| Number of Medical Surgical ICU Beds | 0.30 | 0.23 | 0.25 | 1.43* | 0.71 | 0.99* | 3.88 | 3.16 | 3.73 |
| Total Number of M.D.s | 3.99* | 1.96 | 3.00* | 11.40* | 6.27 | 8.62* | 28.08 | 20.39 | 25.30 |
| Number of Primary Care M.D.s | 2.92* | 1.34 | 2.33* | 7.11* | 4.51 | 5.79* | 14.30* | 10.69 | 12.90* |
| M.D.s-to-100,000 Population | 56.79* | 32.84 | 43.43* | 64.37* | 38.35 | 48.86* | 77.01 | 57.92 | 72.30 |
| Primary Care MDs to 100,000 Population | 42.42* | 26.10 | 34.63* | 40.94* | 27.98 | 32.80* | 39.71 | 30.52 | 37.32 |
| **Environment** | | | | | | | | | |
| January Temperature | 29.57 | 30.35 | 29.59 | 32.67 | 34.19 | 31.89 | 32.44 | 35.91 | 32.36 |
| July Temperature | 74.67 | 75.77 | 75.25 | 75.86 | 76.99 | 76.16 | 75.62 | 76.72 | 75.02 |
| January Precipitation | 1.88 | 1.67 | 1.83 | 2.53 | 2.71 | 2.61 | 2.83 | 3.05 | 2.91 |
| July Precipitation | 3.14 | 3.14 | 2.90 | 3.66 | 3.88 | 3.92 | 3.92 | 4.18 | 4.05 |
| Elevation in Feet | 2158.99 | 2054.91 | 2123.55 | 1348.26* | 1021.35 | 1103.37* | 988.28* | 991.65 | 786.62* |
| **Health Status** | | | | | | | | | |
| Fertility Rate | 7.72 | 8.05 | 8.13 | 7.63 | 7.61 | 7.36 | 7.03 | 7.12 | 7.12 |
| Infant Mortality Rate | 156.59 | 191.18 | 143.47 | 181.02 | 160.61 | 155.50 | 156.92 | 168.56 | 157.85 |
| Total Deaths | 74.28 | 59.73 | 72.72 | 175.55 | 164.48 | 176.99 | 333.01 | 324.03 | 332.59 |
| Deaths from Infective/Parasitic Disease | 8.39 | 8.75 | 6.75 | 8.66 | 8.31 | 7.18 | 7.40 | 8.38 | 8.16 |
| Deaths from Influenza/Pneumonia | 32.78 | 31.64 | 37.33 | 32.42 | 30.01 | 30.07 | 29.13 | 25.26 | 27.11 |
| Deaths from Cardio-Vascular Conditions | 538.22 | 538.07 | 559.01 | 521.95 | 550.88 | 535.79 | 489.14 | 490.68 | 503.15 |
| Incidence of Measles | 27.57 | 30.62 | 28.45 | 34.84 | 44.72 | 23.68 | 28.39 | 29.66 | 32.30 |
| Incidence of Mumps | 20.22* | 17.32 | 8.11* | 10.01 | 18.03 | 17.95 | 9.59 | 18.26 | 9.68 |
| Incidence of Rubella | 23.10 | 6.18 | 6.89 | 4.50 | 5.21 | 3.36 | 5.92 | 8.34 | 10.24 |
| **Crime** | | | | | | | | | |
| Number of Murders | 6.11 | 3.79 | 6.05 | 4.73 | 5.29 | 5.04 | 5.67 | 5.20 | 5.19 |
| Number of Rapes | 6.48* | 5.49 | 3.27* | 7.53 | 5.90 | 7.29 | 8.33 | 8.69 | 8.59 |
| Number of Burglaries | 534.59* | 441.46 | 389.64* | 561.03 | 480.35 | 526.95 | 663.33* | 566.32 | 574.17* |

*Difference is significant at the $p < .05$ level, using a two-tailed t-test.



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## TABLE III.4 (d)

MEAN CHARACTERISTICS OF COUNTIES WITH NET GAINS, NO CHANGE, AND NET LOSSES OF YOUNG NON-FEDERAL PHYSICIANS, BY HMSA STATUS, 1975 AND 1979

| | HMSA STATUS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Non-HMSA | | | Whole HMSA Counties | | | Part HMSA Counties | | |
| Characteristics | Gain | No Change | Loss | Gain | No Change | Loss | Gain | No Change | Loss |
| **Population** | | | | | | | | | |
| Population | 22,788.57* | 12,913.39 | 19,889.81* | 17,895.42 | 10,178.93 | 16,341.29 | 25,243.82 | 16,931.77 | 23,393.25 |
| Population Growth Rate | 13.98* | 10.87 | 10.91* | 14.87 | 10.33 | 13.25 | 18.77 | 14.99 | 13.92 |
| Percent White | 89.85 | 91.34 | 91.44 | 82.97 | 85.92 | 82.85 | 91.84 | 93.93 | 93.38 |
| Percent Black | 7.32 | 6.19 | 6.00 | 14.17 | 10.24 | 15.06 | 4.99 | 3.19 | 3.97 |
| Percent Spanish | 3.73 | 4.73 | 2.87 | 3.90 | 4.59 | 4.71 | 2.17 | 3.62 | 2.61 |
| Median School Years | 11.57 | 11.50 | 11.63 | 11.04* | 11.09 | 10.74* | 11.79 | 11.77 | 11.68 |
| Population Per Square Mile | 38.63 | 22.90 | 35.74 | 31.18 | 18.57 | 30.38 | 31.22 | 23.71 | 33.57 |
| **Cultural** | | | | | | | | | |
| Number Colleges and Universities | 0.24 | 0.07 | 0.19 | 0.05* | 0.02 | 0.11* | 0.24 | 0.05 | 0.29 |
| **Economic** | | | | | | | | | |
| Per Capita Income | $5,727.81 | $5,1797.91 | $5,745.34 | $4,883.00 | $4,868.86 | $4,810.85 | $5,645.82 | $5,970.44 | $5,760.75 |
| Household Income | $11,814.42 | $11,319.98 | $11,854.32 | $4,182.95 | $4,338.91 | $4,131.82 | $11,698.14 | $11,627.18 | $11,544.17 |
| Growth Rate of Per Capita Income | 61.89* | 61.23 | 57.90* | 59.38 | 59.49 | 59.84 | 59.56 | 56.99 | 57.74 |
| Unemployment Rate | 5.79 | 5.25 | 5.59 | 7.33 | 6.28 | 7.39 | 7.17 | 6.49 | 7.27 |
| Percent Agricultural | 13.14* | 19.54 | 14.90* | 14.15 | 21.03 | 15.80 | 12.94* | 18.96 | 15.35* |
| Percent Households Below Poverty Line | 11.99 | 12.93 | 11.74 | 16.34 | 16.85 | 17.65 | 11.49 | 12.17 | 12.43 |
| Percent Persons Below Poverty Line | 15.39 | 16.37 | 15.05 | 20.09 | 20.64 | 21.61 | 14.84 | 15.36 | 15.52 |
| **Health Resources** | | | | | | | | | |
| Number of R.N. Schools | 0.16 | 0.05 | 0.10 | 0.05 | 0.00 | 0.02 | 0.15 | 0.04 | 0.14 |
| Number of FTE R.N.s | 181.37 | 122.42 | 195.55 | 87.29* | 54.69 | 69.90* | 174.78* | 112.43 | 134.69* |
| Number of Physician Extenders per 100,000 Population | 3.96 | 4.10 | 3.85 | 4.81 | 4.20 | 5.21 | 8.16* | 5.80 | 5.58* |
| Number of Hospitals | 2.72 | 2.09 | 2.69 | 1.82 | 1.09 | 1.70 | 3.06 | 2.18 | 2.74 |
| Number of Hospital Beds | 230.27* | 118.04 | 192.34* | 118.39 | 52.69 | 100.72 | 229.34 | 132.04 | 215.27 |
| Number of Neonatal ICU Beds | 0.12* | 0.00 | 0.05* | 0.02 | 0.00 | 0.01 | 0.17 | 0.00 | 0.00 |
| Number of Medical Surgical ICU Beds | 2.70 | 1.06 | 2.02 | 1.05* | 0.31 | 0.62* | 2.12 | 0.89 | 1.93 |
| Total Number of M.D.s | 18.35* | 7.05 | 14.07* | 7.93* | 2.85 | 5.98* | 20.66* | 8.85 | 15.62* |
| Number of Primary Care M.D.s | 10.02* | 4.48 | 7.92* | 5.00* | 2.11 | 3.96* | 11.28* | 5.71 | 8.79* |
| M.D.s-to-100,000 Population | 76.69* | 49.27 | 65.16* | 43.21* | 24.88 | 33.67* | 80.36* | 50.33 | 60.32* |
| Primary Care MDs to 100,000 Population | 45.86* | 35.29 | 40.90* | 29.18* | 19.35 | 24.16* | 46.18* | 35.14 | 36.29* |
| **Environment** | | | | | | | | | |
| January Temperature | 32.48 | 33.10 | 30.39 | 35.61 | 33.05 | 36.01 | 28.36 | 28.62 | 28.54 |
| July Temperature | 76.24 | 77.13 | 75.93 | 76.72 | 76.54 | 77.35 | 72.81 | 72.98 | 73.16 |
| January Precipitation | 2.30 | 1.94 | 2.14 | 3.02 | 2.39 | 3.15 | 2.26 | 2.03 | -2.17 |
| July Precipitation | 3.60 | 3.43 | 3.51 | 4.11 | 3.70 | 4.10 | 3.16 | 2.96 | 3.40 |
| Elevation in Feet | 1,443.18 | 1,542.80 | 1,399.42 | 1,198.81 | 1,520.96 | 1,034.04 | 1,478.70 | 1,901.92 | 1,448.71 |
| **Health Status** | | | | | | | | | |
| Fertility Rate | 7.62 | 8.09 | 7.69 | 7.91 | 8.07 | 8.16 | 7.82 | 7.95 | 7.69 |
| Infant Mortality Rate | 138.34* | 136.03 | 144.90* | 168.97 | 139.09 | 168.18 | 146.70 | 144.80 | 146.75 |
| Total Deaths | 994.85* | 1,079.63 | 1,044.35* | 992.70 | 1,005.45 | 1,007.21 | 989.53 | 996.45 | 996.50 |
| Deaths from Infective/Parasitic Diseases | 6.75 | 6.07 | 6.31 | 8.05 | 6.46 | 8.69 | 7.19 | 5.81 | 6.42 |
| Deaths from Influenza/Pneumonia | 27.44 | 26.32 | 29.66 | 26.98 | 24.77 | 26.67 | 26.10 | 23.76 | 24.75 |
| Deaths from Cardio-Vascular Conditions | 517.53* | 579.27 | 549.07* | 508.76 | 522.24 | 520.35 | 494.55 | 523.08 | 511.51 |
| Incidence of Measles | 6.04 | 7.17 | 7.03 | 4.88 | 3.41 | 6.07 | 11.00 | 5.37 | 6.17 |
| Incidence of Mumps | 12.30 | 6.06 | 12.22 | 9.40* | 7.02 | 1.46* | 4.92 | 4.50 | 2.87 |
| Incidence of Rubella | 4.37 | 5.13 | 7.58 | 3.58 | 1.70 | 4.24 | 9.63 | 5.33 | 3.09 |
| **Crime** | | | | | | | | | |
| Number of Murders | 5.08 | 3.58 | 5.57 | 6.69 | 5.02 | 5.09 | 3.94 | 4.87 | 5.31 |
| Number of Rapes | 7.64* | 5.72 | 5.49* | 6.90 | 5.40 | 6.25 | 8.43 | 8.55 | 9.25 |
| Number of Burglaries | 577.45* | 420.28 | 479.68* | 480.25* | 411.17 | 377.01* | 797.34 | 785.07 | 736.65 |

*Difference is significant at the $p < .05$ level, using a two-tailed t-test.



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## IV. FINDINGS: STAGE II ANALYSIS

### A. INTRODUCTION

The Stage II Community Profiles Analysis examined the location choices made by 1974 through 1978 graduates of U.S. medical schools* who were, in 1983, practicing in non-metropolitan areas. The analysis focused on location patterns of this cohort of physicians as reflected in their distribution among the 2,112 counties which have less than 50,000 population and are not part of a Standard Metropolitan Statistical Area. Of particular interest for this study were several subgroups of counties:

- Counties grouped by Census Region
  - North
  - Central
  - South
  - West
- Counties grouped by population category
  - under 10,000 population
  - 10,000 to 25,000 population
  - over 25,000 population
- Counties grouped by HMSA status
  - non-HMSA
  - whole county HMSA
  - part-county HMSA

These subgroups of counties were selected for special attention based upon our expectation that there may be differences in the distributional patterns of young physicians which are distinguishable by these categories and/or that within each subgroup of counties particular characteristics of the community may be associated with observed distributional patterns.

We also were concerned in this analysis with examining the possibility that physicians with different characteristics may tend to choose different types of practice locations. In addition to looking at the location patterns of all 1974 through 1978 graduates, therefore, we examined and compared the non-metropolitan location patterns of:

- Young physicians who did not serve in the National Health Service Corps

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*As discussed in Chapter II, we were unable to obtain complete data on all 1974 through 1978 graduates of schools of osteopathic medicine.

- o Young physicians who are alumni of the National Health Service Corps program
  - -- M.D.'s separately
  - -- D.O.'s separately

- o Young physicians who are currently repaying an NHSC scholarship obligation through a Private Practice Option in a non-metropolitan area
  - -- M.D.s separately
  - -- D.O.s separately

## B. OVERVIEW OF THE PHYSICIAN POPULATION

The 1974 through 1978 cohort of medical school graduates, who were in a primary care practice in a nonmetropolitan area in 1983, includes 3,058 M.D.s and D.O.s. Of these, 2,641 M.D.s had no prior or current association with the National Health Service Corp and 417 are NHSC alumni. We also examinined 453 current NHSC PPOs, regardless of year of graduation. Table IV.1 summarizes the total population, by specialty and year of graduation for the three groups with which we were concerned.

## C. DISTRIBUTIONAL PATTERNS OF YOUNG PHYSICIANS

Tables IV.2(a) through IV.2(d) summarize the distributional patterns observed for all young physicians and for each of the categories of physicians with which we are concerned:

- o For all non-metropolitan counties
- o By Census Region
- o By county population categories
- o By HMSA status.

The proportion of counties in each of these subgroups which gained and failed to gain young physicians is calculated and the actual number of counties in each category is shown in parentheses.

For those counties which gained young physicians, we created several categories of the absolute number of physicians attracted:

- o counties which attracted 1 or 2 physicians
- o counties which attracted 3 or 4 physicians

- o counties which attracted 5 or 6 physicians
- o counties which attracted 7 or more physicians

We also examined the distribution of counties by number of physicians attracted and by Census Region, population size, and HMSA status of the county.

1. All Young Physicians

Table IV.2(a) presents data on the distributional patterns of all young physicians (i.e. non-NHSC M.D.s, and NHSC alumni). Fifty-eight percent of non-metropolitan counties had gained at least 1 young physican by 1983; while 42 percent failed to attract any young physician in our cohort. Of counties which attracted physicians, 64 percent attracted only 1 or 2. Counties which attracted 3 to 6 young physicians were relatively few -- 32 percent; only 4 percent of all non-metropolitan counties attracted 7 or more young physicians.

When the data were examined by Census Region, clear patterns emerged. The North Census Region counties were most likely (92 percent) to have gained a physician and, in addition, gained more physicians per county than other areas -- 64 percent attracted 3 or more young physicians. In absolute numbers, however, the North represents only a few physicians' location choices since there are only 60 counties in the North which have less than 50,000 population and are not part of an SMSA.

The West Region was the second most attractive part of the country to young physicians; 61 percent of counties gained physicians and, of these counties, 54 percent gained 3 or more. The South and Central Regions appeared less attractive to young physicians. Only 57 percent and 55 percent, respectively, of counties in these regions gained a physician. In both regions, by far the majority of counties gained only 1 or 2 young physicians; 88 percent of attractive counties in the Central Region and 90 percent of attractive counties in the South obtained 4 or fewer physicians.

Examining the distribution of young physicians by county population size yielded findings that are not unexpected: counties with greater population are more likely to be attractive to physicians and to gain a larger number per county. Only 31 percent of counties with less than 10,000 population gained <u>any</u> young physician; of these counties, 89 percent gained only 1 or 2 and only 1 percent gained 5 or more physicians. When we examined counties with 10,000 to 25,000 population and those with 25,000 to 50,000 population, a strong population-related pattern was clear:

- o 62 percent of counties of 10,000 to 25,000 population attracted a physician
- o 92 percent of counties with 25,000 to 50,000 population attracted a physician

While only 8 percent of counties of 10,000 to 25,000 population attracted 5 or more young physicians, 28 percent of most populous counties attracted this many.

Finally, counties grouped by HMSA status showed a consistent pattern:

- Counties which are designated as partial HMSAs attracted physicians more frequently and attracted more physicians per county than did other counties.
- A majority of non-HMSA counties (61 percent) attracted a physician and 14 percent attracted 5 or more physicians.
- Forty-five percent of whole county HMSAs attracted a new physician and, of these only 6 percent attracted 5 or more young physicians.

This pattern was consistent with our findings from the Stage I analysis and suggests that part-county HMSAs may be particularly attractive to young physicians; perhaps because they contain areas with adequate health resources, as well as areas with (presumably) pockets of unmet demand.

2. Young M.D. Physicians Without NHSC Experience

The data in Table IV.2(b) describe the distributional patterns of young physicians who had no association with the National Health Service Corps prior to choosing their practice locations. Examination of these findings indicates that while these distributions are consistent with those observed for all young physicians, there are several interesting differences:

- Only 53 percent of counties gained a non-NHSC physician; thus, 5 percent of non-metropolitan counties gained only an NHSC alumni.
- Non-NHSC physicians appeared equally likely to locate in less populous counties.
- Non-NHSC physicians were somewhat more likely to locate in non-HMSA counties and were somewhat less likely to locate in whole county HMSAs than were all young physicians.

The fact that there are few observable differences in the distributional patterns of all young physicians and non-NHSC physicians is not surprising; since non-NHSC physicians are approximately 80 percent of all young

physicians who graduated between 1974 and 1978, their distributional patterns tend to dominate the totals.

3. NHSC Alumni*

The distributional patterns of NHSC alumni are shown in Table IV.2(c). While NHSC alumni located in only 14 percent of counties — and 93 percent or these counties gained only 1 or 2 — there are evident differences in the distribution of alumni:

- Comparison of the distributional patterns of NHSC physicians by county population size reveals that
  - -- 56 percent of counties with less than 10,000 population failed to attract a non-NHSC physician, compared with 38 percent for NHSC alumni
  - — Only 5 percent of counties which failed to attract a non-NHSC physician had 25,000 or more population compared with 20 percent of the counties which failed to attract an NHSC alumni
  - -- Overall, NHSC physicians were slightly more likely to be in less populous counties than were non-NHSC physicians, 67 percent of counties which gained NHSC alumni had 25,000 or fewer residents compared with 63 percent or counties attracting non-NHSC physicians.
- Substantial differences in distributional patterns of NHSC alumni and non-NHSC physicians are evident when examined by HMSA status of the location:
  - -- 50 percent of counties which were attractive to NHSC alumni were whole county HMSAs while only 27 percent of whole county HMSAs attracted non-NHSC physicians
  - — 31 percent of part-HMSAs gained NHSC alumni compared with 26 percent of counties gaining non-NHSC alumni
  - — Overall, 81 percent of counties which attracted NHSC alumni were wholly or partially-designated HMSAs; while only 53 percent of counties attracting non-NHSC alumni were HMSAs.

Since 58 percent of all non-metropolitan counties are wholly or partially designated as HMSAs, it is evident that NHSC alumni were much more likely to choose a HMSA location than is accounted for by their distribution.

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*Appendix A contains tables describing the distributional patterns of NHSC alumni by M.D. and D.O. status.

Non-NHSC physicians, on the other hand, were slightly less likely to be attracted to these locations.

4. Current PPOs*

As of Fall 1983, PPOs were located in 26 percent of the non-metropolitan HMSA counties in our study. The largest absolute number of HMSA counties with PPO practitioners is in the South Region; however, a higher proportion of HMSA counties in the North and West Census Regions had a PPO present. When we examined distributional patterns by population of the HMSA, we observed that PPOs tended to be in more populous counties more frequently than in less populous counties; although counties with population of 25,000 to 50,000 account for 19 percent of the non-metropolitan HMSA counties being studied, 36 percent have a PPO. Similarly, although counties with less than 10,000 population are 38 percent of HMSA counties, only 16 percent attracted a PPO. To the extent that PPOs had some discretion about their location choices, it appears that their distributional patterns were consistent with those of non-NHSC and NHSC alumni physicians.

Recent PPOs were distributed between whole and part-county HMSAs approximately proportional to their numbers, i.e. part-HMSAs account for 32 percent of all HMSA counties, and 34 percent of all HMSA counties with a PPO are part-HMSAs.

Examination of the distribution of PPOs by the number of PPOs attracted to a particular county indicated that the overwhelming majority of counties which attracted or were assigned a PPO have 1 or 2 present. Only 6.9 percent of counties have 3 or more current PPOs. This result is consistent with a policy of assigning PPOs or NHSC physicians widely in order to increase access to services. Our data indicate that 453 PPOs are located in 335 counties with an average of 1.35 PPOs per county.

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*Appendix A describes the distributional patterns of M.D. and D.O. PPO's separately. Because of the small numbers involved, no discussion and interpretation is offered.

5. Distributional Patterns by Specialty and Year of Graduation of All Young Physicians

To examine the issue of differences in distributional patterns by specialty and year of graduation, Table IV.3 was constructed. Evidence on the location patterns of young physicians, as the supply of physicians increases, suggests that in recent years physicians have begun to diffuse to more rural areas and that this effect is more pronounced for generalist physicians than for specialists.

As would be expected, family practitioners, and to a lesser extent general practitioners, were most likely to be located in the most rural communities; only 6 percent of internists and 3 percent of pediatricians in our cohort were in counties with less than 10,000 population. Family practitioners were least likely to be in the largest non-metropolitan counties, where 65 percent of pediatricians and 60 percent of internists were located.

When we examined distributional patterns by year of graduation, it appears that graduates of the earlier and latest classes were most likely to choose to locate in communities with less than 10,000 population. For counties with 10,000 to 25,000 population, the pattern is similar to that observed in least populous counties. However, for the most populous counties in our study, the trend in later years has been a decline in the proportion of young physicians attracted. Thus, there appears to be some weak evidence in our cohort to support the diffusion hypothesis.

## D. CHARACTERISTICS OF COMMUNITIES WHICH ATTRACTED AND FAILED TO ATTRACT YOUNG PHYSICIANS

The means of characteristics of counties which attracted or failed to attract young physicians are shown in Table IV.4(b) through (d). Significant differences in the means of counties which did and did not attract young physicians are indicated with an asterisk. Again, for this analysis, current PPOs are excluded from the "All Young Physicians" category, since their location decisions are constrained to approved HMSA sites.

Our analysis of community characteristics was conducted on several bases in order to distinguish differences in factors which attracted young physicians in areas with different characteristics, i.e.

- o all counties
- o counties grouped by Census Region
- o counties grouped by population size
- o counties grouped by HMSA status

Within each of these geographic categories, we examined the four young physician groups of interest:

- o all young physicians
- o non-NHSC M.D.s
- o NHSC alumni
- o current PPOs

to determine whether there were differences in the characteristics of communities which these groups find attractive.

1. All Counties

The mean characteristics of all U.S. non metropolitan counties with less than 50,000 population are shown in Table IV.4(a). Variations in these means by Census Region, county population size, and HMSA status are also presented. The discussion in this section examines differences in mean characteristics between counties which did or did not gain young physicians.

a. All Young Physicians

Table IV.4(b) presents the mean characteristics of all counties which attracted and failed to attract all young physicians. There were significant differences in the characteristics of these counties:

- o Attractive counties were more populous, had higher population growth rates, had less Hispanic population, had a better educated population, and a greater population density.
- o Attractive counties were more likely to have colleges and universities and to have urban contiguous counties. Contrary to prior expectations, however, per capita expenditures for education were somewhat lower in attractive counties.
- o With respect to economic variables, income levels were higher in attractive counties, and the work force was more heavily concentrated in white collar and manufacturing activities; there were fewer farmers and a smaller percentage of land in farmland. Attractive counties also tended to have higher unemployment rates and a higher proportion of the population receiving AFDC payments.

- o Health resources were more available in attractive counties that in counties which failed to attract young physicians. However, per capita expenditures for health were lower in attractive counties.

- o With respect to environment, attractive counties were cooler, had more winter precipitation, and were at lower elevations.

- o Health status variables did not present a consistent profile; attractive counties had fewer births and deaths per capita, and a higher incidence of measles.

- o Health utilization per capita was consistently higher in attractive counties. This finding may reflect the greater supply of health resources in these counties or may indicate high levels of demand for care.

- o Crime levels were higher in attractive counties, when rapes and burglaries are considered. There is no difference in the levels of murder per capita.

Overall, the results of the comparison of characteristics of communities which attracted and failed to attract young physicians were consistent both with prior expectations and with the results of the limited Stage 1 analysis. Comparisons of these patterns for physicians of different types, however, are of considerable interest to determine whether NHSC physicians are different from those who did not serve in the NHSC.

### b. Comparisons of Characteristics of Communities Attractive to Non-NHSC Physicians and NHSC Alumni

When we examined the characteristics of counties which were attractive to NHSC alumni (Table IV.4 (c)) and non-NHSC physicians, (Table IV.4(b)) several differences were evident:

- o Counties in which NHSC alumni located were slightly less populous, but experienced faster population growth. In addition, NHSC alumni located in counties which had a higher proportion of minorities and lower population density.

- o NHSC alumni located in areas with lower income populations, absolutely and relative to non-NHSC physician choices. Counties in which NHSC alumni located also tended to have larger households, more unemployment, fewer farms and farmers, and a higher proportion of the population receiving AFDC. In addition, a higher propor-

tion of households lacked complete plumbing in counties gaining NHSC alumni.

- Although there were fewer health resources available in counties gaining NHSC alumni than in counties attracting non-NHSC physicians, counties which failed to gain NHSC alumni have the fewest health resources.

- NHSC alumni chose environments with slightly milder winters. These findings may reflect differences in region of the country in which NHSC alumni and non-NHSC physicians locate.

- Measles incidence was lower in counties gaining NHSC alumni than in counties attracting non-NHSC physicians. Interpretation of this finding is not obvious.

- Health care utilization was lower in counties selected by NHSC alumni than in counties selected by non-NHSC physicians. Areas which were not attractive to NHSC alumni have higher hospitalization and surgical rates.

Thus, there were some differences in the characteristics of communities which attracted NHSC alumni and non-NHSC physicians. Communities in which NHSC alumni located had:

- lower populations
- larger minority populations
- lower income populations
- higher unemployment rates
- fewer health resources
- less health care utilization per capita

These findings suggest that NHSC alumni have chosen practice locations which are distinctly different and in greater need of additional physician services.

c. Comparison of NHSC M.D. Alumni and NHSC D.O. Alumni

There is some evidence that osteopathic physicians are more inclined to locate in more rural, agricultural areas than are M.D.s. A comparison of the characteristics of communities selected by NHSC M.D. alumni and D.O.

alumni support these previous findings. NHSC alumni who are osteopathic physicians chose counties which have:

- o less population
- o fewer people per square mile
- o fewer minorities
- o higher educational levels
- o higher per capita incomes
- o lower unemployment rates
- o fewer white collar workers
- o more farms
- o less poverty
- o fewer health resources
- o fewer M.D. physicians, but more D.O. physicians
- o very low health care utilization levels

Osteopathic physicians appeared to be more likely to choose locations which were unlikely to attract M.D.s, generally. These areas tend to be agricultural, and to have the fewest health resources and associated utilization levels.

d. Communities in Which Recent* PPOs Located

Characteristics of HMSA communities which gained and failed to gain recent PPOs are shown in Table IV.4(d). It should be kept in mind that PPOs are required to locate in communities which are wholly or partially designated a Health Manpower Shortage Area. Thus, the characteristics of gaining counties represent a subset of HMSA counties.

Recent PPOs were located in HMSA counties which have:

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*PPOs in this study were fulfilling their practice obligation in December 1983. Thus, they may not be representative of more recent PPOs who have located under revised NHSC guidelines.

- o more population and have a higher population growth rate
- o more lower income families
- o less agriculture
- o more health resources
- o higher health care utilization per capita
- o higher crime rates.

These results, for the most part, were not surprising. The fact that recent PPOs have chosen more populous and growing HMSAs in which to locate suggests that some PPOs may be considering long run practice opportunities in choosing a PPO practice.

Comparison of M.D. PPO and D.O. PPO community characteristics yields findings similar to those for M.D. and D.O. alumni. Osteopathic physicans chose to locate in less populated, less dense, more agricultural areas; they chose areas with somewhat fewer health resources and with relatively low health care utilization levels.

The consistency of the findings for current PPOs and NHSC alumni suggests that:

- o Some PPOs have selected communities in which they intend to remain permanently in practice, and/or
- o The NHSC experience had a significant effect on later location decisions of alumni. A major objective of the analyis of individual physicians location decisions during the final phase of this study will probe the latter issue.

2. Census Region

The means of characteristics of counties which attracted and failed to attract all young physicians, physicians with previous NHSC experience, non-NHSC physicians, and current PPO physicians are shown by Census Region in Tables IV.5(a), (b), (c), and (d), respectively. Examination of these data and of significant differences between counties which attracted and failed to attract these categories of young physicians yields interesting differences, similarities, and patterns.

a. All Young Physicians

The data in Table IV.5(a) reveal that "population" is a distinguishing characteristic of counties which attracted all young physicians for all four Census Regions. In all of the regions, counties which attracted young physicians had larger average population than did counties which failed to attract. "Population growth rate" distinguished counties which gained young physicians from those which did not in the South Region. Population density also exhibited mixed associations when stratified by Census Region: only in the North and Central Regions did it distinguish counties which gained young physicians from those which did not. However, across all Census Regions, the population density was highest in counties which attracted young physicians. The racial mix of the population did not perform consistently in differentiating counties which gained young physicians from those which did not. Educational levels of the population differentiated counties which gained young physicians from those that did not in all but the North Census Region.

Among the cultural variables, the "number of colleges and universities" was a key distinguishing characteristic for all Census Regions; in all cases, gaining counties had a higher number than do counties which failed to attract young physicians. "Per capita educational expenditures" was significant in the South and West Regions, although in these regions counties which failed to gain young physicians had higher mean expenditures. The number of urban contiguous counties was significant in the Central and West Regions; however, in all regions the differences in the means were relatively small.

The only economic variable that distinguished counties which attracted young physicians from those that did not across all four Census Regions was the "number of farms." In all counties that gained young physicians, the number of farms was substantially higher than in counties which failed to gain young physicians. Moreover, in all regions except the North, "farmland as a percent of the total land" distinguished counties which gained and failed to gain young physicians. However, while the number of farms was higher in gaining counties, the percent of the land as farmland was smaller. In none of the regions was "per capita farm income" a distinguishing characterisitic.

Many of the economic variables distinguished counties which gained from those that failed to gain young physicians in the Central, South, and West Regions. In the Central Region "per capita income," "household income," "growth rate of the per capita income," were distinguishing characteristics, while in all three regions "unemployment rate," and "percent of labor force white collar" were distinguishing characteristics. In all three regions young physicians were more likely to locate in counties with higher rates of unemployment and larger proportions of white collar workers. In addition, for the Central and South Regions, characteristics such as "percent labor force in manufacturing," "working in the state/county of residence," and "working in the state but not the county of residence" distinguished counties which gained young physicians from those that did not; only the latter variable is negatively significant. It is interesting

that, beside the number of farms, no economic variables were significant in the North Region. This could reflect homogeneity in the makeup of rural North Region counties, or the fact that young physicians go to these counties for reasons other than economic conditions.

In all regions but the North, poverty measures distinguished counties which gained from those which failed to gain young physicians. The "percent of households below the poverty line" and the "percent of persons below the poverty line" were significant in these regions. In all regions except the North, counties which gained young physicians had a lower percentage of households and persons living below the poverty line.

Health resources were among the most consistent variables distinguishing counties that attracted and failed to attract young physicians in all of the regions. Examination of the means of these variables by Census Region revealed that the following health resources characteristics exhibit positive and significant differences between counties which gained young physicians and those that did not for all four regions:

- o number of hospitals
- o number of hospital beds
- o total number of M.D.s
- o total number of D.O.s
- o number of primary care D.O.s
- o M.D.-to-100,000 population

Overall, the health resources characteristics performed strongly across all Census Regions in distinguishing gaining counties.

With respect to health status, the Central Region most consistently revealed characteristics that distinguished counties which gained or from those that failed to gain young physicians, including "fertility rate," "deaths per 100,000 population," "deaths per 100,000 population from cardiovascular conditions," and the "incidence of mumps and measles per 100,000 population." Interestingly, the incidence of measles and mumps, deaths per 100,000 population, and deaths per 100,000 population from cardio-vascular conditions were lower in counties that gained young physicians; moreover, the fertility rate was lower in gaining counties across all of the Census Regions.

Health utilization measures were the most consistent variables distinguishing counties which attracted and failed to attract young physicians in the North, Central, and South Regions. In these regions all of the variables (except "inpatient hospital visits per 100,000 population") were higher in gaining than in non-gaining counties. In the West, only

inpatient visits and emergency hospital visits were not significant characteristics for distinguishing the counties. In the vast majority of cases, counties which attracted physicians had higher average utilization rates.

### b. Comparison of Characteristics of Communities Attractive to Non-NHSC Physicians and NHSC Alumni, by Census Region

To discern whether physicians with NHSC experience locate in counties with different characteristics than physicians without NHSC experience, mean county characteristics for counties which did or did not gain these categories of physicians were compared by Census Region (Tables IV.5(b),(c)).

For both NHSC alumni and non-NHSC physicians, population was a key distinguishing characteristic for all regions. In all instances, counties which gained both NHSC alumni and non-NHSC physicians had larger average populations than did counties that failed to gain these physicians. Population density appeared to be more important to non-NHSC physicians. This characteristic was significant in the North, South, and West Regions and was substantially higher in counties that gained non-NHSC physicians than in those that did not. For alumni, this variable was significant in the Central and South Regions, but the magnitude of differences across counties that gained and failed to gained was not nearly as wide.

A major distinction between counties that were attractive to non-NHSC physicians and NHSC alumni was that for the former, the average level of education was a positively significant characteristic across three Census Regions (Central, South, and West), while for NHSC alumni this did not appear to be an important location criterion. Consistent with this finding, other cultural variables (i.e., "number of colleges and universities," "per capita educational expenditures," and "number of urban contiguous counties") were positively significant for distinguishing counties that were attractive to non-NHSC alumni, but, except for the West Region where these characteristics are important for both alumni and non-alumni, counties that were attractive to alumni were not distinguishable by these variables. Thus, it is evident that the quality of education and the availability of cultural pursuits were important to the location decisions of non-NHSC physicians, but were not consistently significant to NHSC alumni.

Economic variables performed the strongest in the Central Region in distinguishing counties which gained both NHSC alumni and non-NHSC physicians. "Per capita income," "household income, "and the "growth in per capita income" were all significant for the Central Region for both categories of physicians. However, in counties that attracted non-NHSC alumni, these income measures were, for the most part, higher than for counties that did not attract these physicians; counties which were attractive to alumni exhibited lower income measures. Similarly, measures of poverty ("percent of households below the poverty line," and "percent persons below the poverty line") yielded opposite results for counties that gained non-NHSC physicians and those that gained alumni. Thus, it appears

that, possibly as a result of the NHSC experience, alumni located in the more depressed economic areas.

The "percent of the workforce in agriculture" was significant for both groups of physicians across all but the North Region. In these cases, counties that gained physicians had fewer agricultural workers, as well as relatively less land devoted to farming. Both physician groups preferred areas with a higher "percentage of the workforce engaged in white collar and manufacturing," for non-NHSC physicians, these characteristics are significant in the Central, South, and West Regions; for NHSC alumni, "percent in white collar jobs" was significant in the Central and West Regions, and "percent in manufacturing" was significant in the Central Region.

For all of the regions, health resources were key distinguishing characteristics for counties which gained and failed to gain non-NHSC physicians. In the Central, South, and West Regions, many of these variables also are significant for distinguishing counties that gained alumni from those that did not, but not as consistently as they were for non-NHSC physicians. Moreover, while non-NHSC physicians located in areas with substantially higher aggregate levels and per population ratios of health resources, NHSC alumni tended to choose areas which have fewer health resources. In general, these findings support the contention that, in all Census Regions, physicians with NHSC experience choose to locate in areas where there are fewer health resources.

For non-NHSC physicians, health utilization variables performed strongly in distinguishing counties that attracted these providers. Across all Census Regions, non-NHSC physicians located in counties with substantially higher health services utilization levels. In contrast, utilization measures, for the most part, performed more weakly in distinguishing counties that were selected by NHSC alumni. The one exception is in the West Region where NHSC alumni located in areas which exhibit higher utilization rates.

c. Recent PPOs, by Census Region

When characteristics of counties are examined for HMSA counties in which recent PPO physicians located (Table IV.5(d)) by Census Region several findings of interest are noted:

- o Population was a distinguishing characteristic for all Regions except the West, which had the smallest mean population. "Population growth rate" and population density were distinguishing characteristics for the Central and South Regions, but failed to be significant for the North and West Regions. Demographic characteristics of the population continued to perform erratically with no evident pattern emerging.

- o Economic variables were nonsignificant in the West Region, except for "percent working in state/not county of residence" and the "percent agricultural." In the North and South Regions most economic variables performed erratically in distinguishing counties which gained current PPO physicians from those that did not. In the Central Region, variables which indicate economic well-being ("household income," "growth rate of per capital income," "unemployment rate," "percent of households below poverty line," and "percent persons below poverty line") were significant. Counties which gained current PPO physicans had lower rates for households and persons below the poverty level, although the unemployment rate was higher in these counties (as was the percent of the population receiving AFDC). Interpretation of these variables, therefore, was difficult.

- o Health resources, for the most part, performed erratically in distinguishing gaining counties from those that did not. Only "local per capita expenditures for health" was significant in at least three regions (North, Central, South). In all cases, the mean values for this variable was lowest in counties that gained PPO physicians.

- o Most health status measures were insignificant with respect to distinguishing counties that gained or failed to gain PPO physicians. Only the "ferility rate" was significant in at least three regions (Central, South, West). However, there was no consistency across the regions concerning whether this variable is positively or negatively significant: in the Central and South Regions it was negative and in the West it was positive.

- o Environment, health utilization, cultural and crime variables performed erratically with no evident pattern emerging, by Region.

### 3. County Population Size

The means of characteristics of counties which gained or failed to gain young physicians by county population size are shown in Tables IV.6(a) through IV.6(d). For each county population classification, all young physicians, non-NHSC physicians, NHSC alumni, and current PPO physicians were examined to determine whether there are differences in the characteristics of communities in which these groups locate.

a. All Young Physicians

Table IV.6(a) presents the mean characteristics of counties by county population size, which gained and failed to gain all young physicians. These data revealed several findings of interest:

- Population was a distinguishing characteristic in counties with under 10,000 population and in counties with 10,000 to 24,000 population. In all county population groups counties which gained young physicians had larger populations. "Population growth rate," and "population per square mile" were significant in only those counties with 10,000 and under population, and were higher for more attractive communities.

- Per capita educational expenditures was a distinguishing characteristic for all county population classes. However, the mean was lower for attractive communities in the smallest counties; for larger counties per capita educational expenditures were higher in communities which gained a physician. The "number of colleges and universities" was positive and significant in the two smaller county population groups, but not in the 25,000 and over county population group. The "number of urban contigous counties" was significant for this latter group, but indicates that attractive counties are less frequently close to urban areas.

- Economic variables were important distinguishing factors for counties in the 10,000 to 24,000 population group. In particular, measures of economic well-being such as "per capita income," "household income," and "unemployment rate" were positive and significant. Direct measures for poverty status ("percent households below poverty line," "percent persons below poverty line," and "percent households lacking complete plumbing") were also significant for this county population group and were lower in counties which gained young physicians. The unemployment rate and the percent of households and persons below the poverty line were significant also in the counties with under 10,000 population. Overall, counties with less poverty were more likely to be attractive to young physicians. The percent of the workforce in agricultural and white collar occupations were significant for the two smaller population groups; attractive counties had greater percentages of the population in white collar occupations and fewer agricultural workers relative to less attractive counties. "Farmland as a percent of total land" was consistently lower in attractive counties, although it was significant for only the under 10,000 population group.

- With respect to health resources, in all counties physicians were more likely to locate in areas with greater health resources. Several key aggregate and per population measures were significant across the three county population classifications: "number of hospitals," "number of hospital beds," "M.D.s-to-100,000 population," and "primary care M.D.s-to-100,000 population." In all cases, counties which gained young physicians had higher mean values for these health resources. Expenditures for health was significant for only counties with under 10,000 population; and attractive counties had lower health expenditures. The availability of additional health resources was also significant. The "number of FTE R.N.s per 100,000 population" distinguished attractive counties in all county groups and was substantially higher in attractive counties. The "number of R.N. schools" was positive and significant in the 10,000 to 24,000 and over 25,000 county groups.

- Health status variables exhibited mixed association without providing a discernible pattern.

- For the 10,000 to 24,000 county population group, some environmental factors appeared to affect young physicians' location decisons: January temperature, July temperature, and July precipitation were all lower in counties which gained young physicians. Crime variables were nonsignificant.

- All of the health utilization variables distinguished counties which are attractive to young physicians from those that were not across all of the county population classifications, with attractive counties exhibiting higher rates of use.

Overall, the results of the comparison of characteristics of communities which gained and failed to gain young physicians revealed few differences across county population groups.

### b. Comparison of Characteristics Attractive to Non-NHSC Physicians and NHSC Alumni, by County Population Size

When the characteristics of counties which were attractive to NHSC and non-NHSC physicians (Tables IV.6(b), (c)) were examined by county population groups, several differences were apparent:

- Population was a key distinguishing characteristic for counties which were attractive to non-NHSC physicians,

regardless of county population group. In all cases, counties which gained non-NHSC physicians had larger mean populations. For NHSC alumni, this variable was positive and significant for only counties with under 10,000 population. For alumni the "population growth rate" was significant in both the smaller population groupings, while it was significant in only the under 10,000 population counties for non-NHSC physicians. In all of these cases, however, counties which gained physicians had higher growth rates than those counties which failed to gain. In the 10,000 to 24,000 population counties, the "percent white," the "percent black," and the "median school years" were important to non-NHSC physicians' location decisions. It appears that these physicians chose to locate in areas in which the minority population was smaller.

- Cultural variables consistently distinguished attractive counties for non-NHSC physicians in the 10,000 to 24,000 population group, indicating that these physicians chose to locate in areas where there are more colleges and universities and higher per capita expenditures on education. Otherwise, these variables exhibited mixed associations.

- Economic factors performed the strongest in the 10,000 to 24,000 population group in distinguishing counties which were attractive to both NHSC alumni and non-NHSC physicians from those that were not. This was particularly true for non-NHSC physicians in this county group where both direct and non-direct measures of economic well-being were found to be significant; the counties attracting these physicians had consistently higher income and, otherwise, were better off economically. The distribution of the workforce across various occupations was also significant in this county group. Whereas the "percent labor force in white collar" occupations was higher in attractive counties, the opposite was true for "agricultural workforce" across all of the county groups. This latter finding was also evident and significant for the NHSC alumni. Lower "percentage of land" devoted to farming distinguished counties gaining NHSC alumni.

- For all three county population groups, and especially the 10,000 to 24,000 population group, health resources were key distinguishing characteristics for counties which were attractive to non-NHSC physicians. These variables tended to perform erratically for the examination of NHSC alumni. It was noteworthy, however, that non-NHSC physicians consistently chose to locate in areas with relatively greater aggregate and per population

health resources, while alumni were frequently located in areas with fewer relative health resources.

- o Health status measures revealed mixed associations without a precise pattern emerging. Crime variables also yielded erratic associations, although these variables are positively significant for NHSC alumni in counties with over 25,000 population.

- o For non-NHSC physicians, health utilization variables performed strongly in distinguishing counties that were attractive to these providers. Across all county population groups, non-NHSC physicians chose counties with substantially higher health services utilization levels. In contrast, utilization measures performed more weakly in distinguishing counties in which NHSC alumni located.

Overall, the findings suggest that some NHSC physicians chose practice locations that were less attractive to non-NHSC physicians; however, with the exception of the least populous counties, no strong differences by county size seem evident.

c. Recent PPOs

When characteristics of counties are examined for HMSA counties in which recent PPO physicians did and did not locate (Table IV.6(d)) by county population size, several findings of interest are noted:

- o Higher population was significant only for the under 10,000 county population group; "Population growth rate" was significant only for the 10,000 to 24,000 population group although attractive counties in all groups tended to exhibit higher growth rates. Other population variables exhibited mixed associations.

- o Cultural variables were, for the most part, non-significant--except for "per capita educational expenditures" which was significant and positive in the 10,000 to 24,000 population group.

- o Economic variables distinguished attractive counties most frequently in the under 10,000 and 10,000 to 24,000 population classes. In the under-10,000 population group, counties which appeared to be better off economically gained PPOs. This was evidenced by a higher "labor force participation rate," lower percentage of households and persons below the poverty level, and a smaller percent of the population receiving AFDC in these counties. In the 10,000 to 24,000 population group, the economic variables

exhibited mixed associations: counties which gained PPOs had a higher growth rate in per capita income, although the unemployment rate was also higher. Variables that indicated the extent of agricultural activity ("percent agricultural," "farmland as a percent to total land," and "number of farms") were all significant and negative. In the 25,000 and over population group, the "unemployment rate," and the "percent of households without plumbing" were significant and positive.

- The availability of certain health resources (i.e. number of hospitals, hospital beds, and beds per population) served as distinguishing characteristics in the under 10,000 population group. Moreover, the mean values for these characteristics were consistently higher in counties that gained PPOs relative to counties that did not. In contrast, in the largest population group, PPOs tended to locate in counties that had fewer hospital beds and beds per population.

- "July temperature" was significant and negative in the two larger population classifications: PPOs appeared to prefer counties that have cooler summer temperatures. Otherwise, environmental variables were weak in distinguishing between counties which did and did not gain PPO physicians.

- Health status, and crime variables did not exhibit a clear and systematic pattern in distinguishing counties that were attractive to PPOs.

- With respect to health utilization variables, "inpatient surgical operations per 100,00 population" and "total surgical operations per 100,000 population" were negative and significant for the 25,000 and over population group. In the two smaller population groups the number of "emergency hospital visits per 100,000 population" was positive and significant. Other health utilization measures failed to distinguish counties which gained PPOs from those that did not.

The examination of differences in the characteristics of HMSA communities which were attractive to PPO physicians revealed that these providers were, for the most part, locating in HMSAs which have characteristics which were attractive to all physicians. This suggests that at least some PPOs may be choosing locations in which they intend to practice permanently.

4. HMSA Status

a. All Young Physicians, By HMSA Status

An interesting finding has been that counties designated as partial HMSAs were most likely to be attractive to new young physicians. Calculation of means of characteristics for counties grouped by HMSA status serves to differentiate the significance of county characteristics by HMSA classification.

Population variables, on the whole were significant in distinguishing counties which are attractive to all young physicians, regardless of HMSA status (Table IV.7(a)) Population and population density were distinguishing characteristics for all HMSA classifications. Racial composition variables did not, on the whole, exhibit a pattern of significance but it is interesting to note that whole HMSA counties in which young physicians located had significantly greater minority populations than those which failed to gain. Of further significance were the mean populations across HMSA status which indicated that part HMSA counties had the highest average populations.

Cultural variables served as distinguishing characteristics but not with any consistency across HMSA status. The number of colleges and universities was significant for part and non-HMSA counties but not for whole-HMSA counties. The number of urban contiguous counties and per capita educational expenditures was significant for whole and non-HMSA counties, but not part-HMSA counties. Counties with lower per capita expenditures on education attracted young physicians; however as we observed earlier, in counties with over 10,000 population, physicians preferred locations which exhibited higher per capita educational expenditures. Thus, this finding, when we disaggregate communities by HMSA status reflects the aggregation of counties by population size.

Certain types of economic variables served as distinguishing characteristics across all HMSA classifications. Work force composition and agricultural variables were significant regardless of HMSA status. Young physicians were on average locating in counties with higher proportions of white collar and manufacturing workers,and a lower proportion of agricultural workers. They also chose counties with a lower proportion of total land devoted to farming. Income variables were not significant across all HMSA classifications with the exception of the growth rate of per capita income, which was positive and significant in part-HMSA counties. Per capita, household, and per capita farmer incomes were not distinguishing characteristics for counties which did and did not gain young physicians. Variables indicating poverty and employment characteristics did not behave in a systematic pattern across HMSA groups. Among non-HMSA counties, young physicians were significantly more likely to locate in counties with a lower proportion of persons in poverty, and a higher proportion of unemployment.

Variables which measure health resources exhibited a clear and systematic pattern and served as distinguishing characteristics across all HMSA classifications. Young physicians locate in counties with larger

aggregate and per population levels of health resources. Health status variables exhibited little significance across all HMSA groups.

Variables measuring health utilization behaved similarly to those measuring health resources. Nearly all variables in this category were significant across all HMSA groups. Young physicians located in counties with higher per population levels of health utilization. Within whole-HMSA counties, overall utilization was lower than in part-HMSAs; nevertheless, physicians located in counties where utilization was higher.

Variables measuring health resources and health utilization performed most consistently for distinguishing counties which gained young physicians from those that did not, regardless of HMSA status. It was further interesting to examine means across HMSA status. The aggregate means of variables in these two categories were very similar for counties which were attractive to physicians in the non-HMSA and part HMSA groups. Furthermore, these aggregate means tended to be much larger than the means for whole HMSA counties. This implies that, on average, part-HMSAs were very similar to non-HMSAs in terms of health resources and utilization, and dissimilar to counties designated as whole-HMSAs. Other measures such as population, per capita and household income, and percent of households below the poverty line exhibited this same pattern. This can serve to help explain the relative attractiveness of part-HMSA counties to young physicians. They are very much like non-HMSA counties for characteristics which are attractive to new young physicians.

b. Comparison of Non-NHSC M.D. and NHSC Alumni, by HMSA Status

It is useful to compare physicians with NHSC experience and non-NHSC physicians when examining mean county characteristics by HMSA status (Tables IV.7(b), (c)). One would expect NHSC alumni to differ from non-NHSC physicians in the types of counties they practice in across HMSA status.

In non-HMSA counties, population and population growth rate were distinguishing characteristics for both NHSC and non-NHSC physicians. Both physician groups found attractive, on average, non-HMSA counties with an equal mean population. In whole HMSA counties the above two variables were again significant, as was population per square mile, for both physician groups. This makes sense as geographical dispersion and isolation are more prevalent in whole HMSA counties, and thus population density may become an important factor in location decisions. For part-HMSA counties, population was again a distinguishing characteristic for both physician groups. In counties which gained physicians, part-HMSAs have the highest mean population, followed by non-HMSA and whole HMSA counties.

In non-HMSA counties, household income was a distinguishing characteristic for non-NHSC M.D.s, while it was not for NHSC physicians. Non-HMSA counties which were attractive to non-NHSC M.D.s have higher average household incomes than counties which did not. For whole HMSA counties, income variables were not significant for either group of physicians. For

part-HMSAs, both per capita and houshold income were significant for NHSC physicians. Interestingly, NHSC physicians located in part-HMSA counties which had lower average per capita and household income, unlike the finding for non-NHSC physicians. This observation could be related to the NHSC experience, as alumni who locate in a part-HMSA seek out the more depressed economic areas. Percent agricultural and percent white collar were significant for both groups regardless of HMSA status, with physicians on average locating in counties with more white collar and less farm workers. Both groups preferred counties with less land devoted to farming activity. Direct measures of poverty status were hard to interpret as they exhibit no pattern. In whole-HMSA counties, NHSC physicians chose counties with higher proportions of AFDC recipients while non-NHSC physicians did not. Again, this could reflect the NHSC experience, or a pre-existing or developed interest in depressed areas.

Health resource variables were clearly significant in distinguishing counties which did and did not gain both groups of physicians regardless of HMSA status. Generally, both groups of physicians located in areas with higher levels of per population and aggregate resources. However, there were important differences. In the physician total and ratio variables, the disparities in the means for counties which attracted and failed to gain physicians were much greater for non-NHSC physicians regardless of HMSA status. In fact, physician ratios were not distinguishing characteristics for NHSC physicians while they were for non-NHSC physicians. This supports the finding, across HMSA status, that physicians with NHSC experience located in counties with relatively fewer physicians.

For non-NHSC physicians, all health utilization variables were distinguishing characteristics across all HMSA county groups. Non-NHSC M.D.s were attracted to counties with higher levels of per population health utilization. They located in counties with high demand for health services. Utilization variables were much weaker in distinguishing between counties which did and did not gain NHSC physicians. For part-HMSA counties, no utilization variables were significant, implying that the location decisions of NHSC physicians were not tied to high use for services. The same holds for non-HMSA counties except for emergency visits. In whole-HMSA counties, health utilization did distinguish counties which were attractive to physicians with NHSC experience. This implies that in whole-HMSA counties, NHSC physicians have located in areas with high unmet need and demand for services.

### c. Recent PPOs, By HMSA Status

Analysis of mean characteristics of HMSA counties in which recent Private Practice Option physicians located was limited to only two categories when stratified by HMSA status: part and whole-HMSA counties (Table IV.7(d)). Physicians serving as PPOs are not able to practice in non-HMSA counties.

In part-HMSA counties, no population variables significantly distinguished those counties which gained PPOs from those that didn't. In whole HMSA counties, population growth rate and population density were both distinguishing characteristics. There were 628 counties designated as whole-HMSAs which did not gain a primary care PPO physician. The direction of the population variable's significance implies that these counties were disproportionately smaller, slower growing, and less dense than those counties which managed to attract a PPO physician.

For part-HMSA counties, economic variables did not on the whole distinguish counties which gained PPOs from those that didn't. Percent of workers in agriculture, per capita farmer income, and farmland were all significant. Part HMSA counties with a lower proportion of farmers and farmland, and a higher per capita farmer income attracted PPOs. Unexpectedly, household income was negatively significant; PPOs were attracted to part HMSA counties with lower average household income. In whole HMSA counties, percent white collar, percent agricultural, and percent of households and persons below the poverty line were all significant characteristics. Whole-HMSA counties which failed to gain a PPO physician had proportionately more farmers, less white collar workers, and more persons and households in poverty than those counties which gained a PPO physician.

Health resource variables did not serve as distinguishing characteristics for part-HMSA counties. Only physician extenders per population and per capita health expenditures were significant. This varies from findings for other physician groups perhaps due to the fact that some PPOs are assigned. Indeed, many patterns for the PPOs ultimately derive from the system of placement under which the physicians in the study were located. For whole-HMSA counties, many health resource variables did serve as distinguishing characteristics. PPOs were located in whole HMSA counties with generally higher aggregate and per population levels of health resources.

Much the same pattern was observed for health utilization measures as for health resources. Only per capita emergency visits was a distinguishing characteristic for part-HMSA counties while all utilization variables were distinguishing characteristics for whole-HMSA counties. This lends further support to the hypothesis that PPOs are directed toward whole-HMSA counties with high levels of unmet need. Comparison of aggregate utilization across HMSA status revealed that per population usage was much lower in whole-HMSA counties which also imples a higher level of unmet need than exists in part-HMSA counties.

TABLE IV.1

NUMBER AND DISTRIBUTION OF THE STUDY POPULATIONS,
BY SPECIALTY AND YEAR OF GRADUATION

| Population Group | Total Number | Specialty | | | Year of Graduation | | | | | (Other Years) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GP/FP | IM | PD | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
| All Young Physicians* | 3058 (100.0) | 2107 (69.0) | 709 (23.0) | 242 (8.0) | 528 (19.0) | 510 (17.0) | 622 (22.0) | 588 (20.0) | 684 (22.0) | -- | -- | -- | -- |
| Non-NHSC M.D.s | 2641 (100.0) | 1806 (68.0) | 624 (24.0) | 211 (8.0) | 510 (20.0) | 483 (18.0) | 560 (21.0) | 495 (19.0) | 593 (22.0) | -- | -- | -- | -- |
| NHSC Alumni | 417 (100.0) | 301 (72.0) | 85 (21.0) | 31 (7.0) | 18 (6.0) | 27 (9.0) | 62 (22.0) | 93 (32.0) | 91 (31.0) | -- | -- | -- | -- |
| Recent PPOs | 453 (100.0) | 314 (69.0) | 107 (24.0) | 32 (7.0) | -- | -- | 11 (2.0) | 36 (8.0) | 88 (20.0) | 77 (17.0) | 126 (28.0) | 61 (13.0) | 54 (12.0) |

*All Young category includes Non-NHSC M.D.s and NHSC Alumni: PPO's are excluded.

TABLE IV.2(a)

DISTRIBUTION OF COUNTIES WHICH DID AND DID NOT GAIN
YOUNG PHYSICIANS, BY REGION, COUNTY POPULATION, AND COUNTY HMSA STATUS

| Physician Supply | All Non-Metropolitan Counties | Region | | | | County Population | | | HMSA Status | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | North | Central | South | West | Under 10,000 | 10,000 -25,000 | Over 25,000 | Non-HMSA | Whole-HMSA | Part-HMSA |
| Failed to Gain | 42.0% (893) | 8.0 (5) | 45.0 (359) | 43.0 (415) | 39.0 (114) | 69.0 (513) | 38 (341) | 8.0 (39) | 39.0 (346) | 55.0 (459) | 22.0 (88) |
| Gained Physicians | 58.0 (1219) | 92.0 (55) | 55.0 (436) | 57.0 (553) | 61.0 (175) | 31.0 (227) | 62.0 (568) | 92.0 (424) | 61.0 (532) | 45.0 (378) | 78.0 (309) |
| Number Gained | | | | | | | | | | | |
| 1 - 2 | 64.0 | 36.0 | 68.0 | 70.0 | 46.0 | 89.0 | 71.0 | 42.0 | 61.0 | 78.0 | 53.0 |
| 3 - 4 | 22.0 | 27.0 | 20.0 | 20.0 | 31.0 | 10.0 | 21.0 | 30.0 | 25.0 | 16.0 | 25.0 |
| 5 - 6 | 10.0 | 26.0 | 8.0 | 8.0 | 13.0 | 1.0 | 6.0 | 19.0 | 10.0 | 5.0 | 13.0 |
| 7 or More | 4.0 | 11.0 | 4.0 | 2.0 | 10.0 | 0.0 | 2.0 | 9.0 | 4.0 | 1.0 | 9.0 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| TOTAL | | | | | | | | | | | |
| Number | 2112 | 60 | 795 | 968 | 289 | 740 | 909 | 463 | 878 | 837 | 397 |
| Percent | 100% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

TABLE IV.2(b)

DISTRIBUTION OF COUNTIES WHICH DID AND DID NOT GAIN YOUNG M.D.S WITH NO NHSC EXPERIENCE, BY REGION, COUNTY POPULATION, AND COUNTY HMSA STATUS

| Physician Supply | All Non-Metropolitan Counties | Region | | | | County Population | | | HMSA Status | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | North | Central | South | West | Under 10,000 | 10,000 -25,000 | Over 25,000 | Non-HMSA | Whole-HMSA | Part-HMSA |
| Failed to Gain | 47.0% (991) | 15.0 (9) | 49.0 (388) | 48.0 (469) | 43.0 (125) | 75.0 (553) | 43.0 (389) | 11.0 (49) | 41.0 (356) | 64.0 (532) | 26.0 (103) |
| Gained Physicians | 53.0 (1121) | 85.0 (51) | 51.0 (407) | 52.0 (499) | 57.0 (164) | 25.0 (187) | 57.0 (520) | 89.0 (414) | 59.0 (522) | 36.0 (305) | 74.0 (294) |
| Number Gained | | | | | | | | | | | |
| 1 - 2 | 67.0 | 47.0 | 69.0 | 72.0 | 52.0 | 93.0 | 74.0 | 47.0 | 62.0 | 83.0 | 58.0 |
| 3 - 4 | 23.0 | 29.0 | 20.0 | 21.0 | 32.0 | 7.0 | 21.0 | 32.0 | 25.0 | 14.0 | 28.0 |
| 5 - 6 | 7.0 | 16.0 | 7.0 | 6.0 | 9.0 | - | 4.0 | 14.0 | 9.0 | 3.0 | 8.0 |
| 7 or More | 3.0 | 8.0 | 4.0 | 1.0 | 7.0 | - | 1.0 | 7.0 | 4.0 | - | 6.0 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| TOTAL | | | | | | | | | | | |
| Number | 2112 | 60 | 795 | 968 | 289 | 740 | 909 | 463 | 878 | 837 | 397 |
| Percent | 100% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

TABLE IV.2(c)

DISTRIBUTION OF COUNTIES WHICH DID AND DID NOT GAIN PHYSICIANS
WITH NHSC EXPERIENCE, BY REGION, COUNTY POPULATION, AND COUNTY HMSA STATUS

| Physician Supply | All Non-Metropolitan Counties | Region | | | | County Population | | | HMSA Status | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | North | Central | South | West | Under 10,000 | 10,000 -25,000 | Over 25,000 | Non-HMSA | Whole-HMSA | Part-HMSA |
| Failed to Gain | 86.0% (1810) | 63.0 (38) | 90.0 (715) | 86.0 (833) | 78.0 (224) | 92.0 (682) | 84.0 (764) | 79.0 (364) | 94.0 (821) | 82.0 (685) | 77.0 (304) |
| Gained Physicians | 14.0 (302) | 37.0 (22) | 10.0 (80) | 14.0 (135) | 22.0 (65) | 8.0 (58) | 16.0 (145) | 21.0 (99) | 6.0 (57) | 18.0 (152) | 23.0 (93) |
| Number Gained | | | | | | | | | | | |
| 1 - 2 | 92.7 | 77.0 | 95.0 | 94.0 | 92.0 | 97.0 | 96.0 | 86.0 | 96.0 | 93.0 | 89.0 |
| 3 - 4 | 6.6 | 18.0 | 5.0 | 6.0 | 6.0 | 3.0 | 4.0 | 12.0 | 4.0 | 7.0 | 9.0 |
| 5 - 6 | 0.3 | 5.0 | - | - | - | - | - | 1.0 | - | - | 1.0 |
| 7 or More | 0.3 | - | - | - | 2.0 | - | - | 1.0 | - | - | 1.0 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| TOTAL | | | | | | | | | | | |
| Number | 2112 | 60 | 795 | 968 | 289 | 740 | 909 | 463 | 878 | 837 | 397 |
| Percent | 100% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

TABLE IV.2(d)

DISTRIBUTION OF HMSA COUNTIES WHICH DID AND DID NOT GAIN PPOs, BY REGION, COUNTY POPULATION, AND COUNTY HMSA STATUS

| Physician Supply | All Non-Metropolitan Counties | Region | | | | County Population | | | HMSA Status | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | North | Central | South | West | Under 10,000 | 10,000 -25,000 | Over 25,000 | Whole-HMSA | Part-HMSA |
| Failed to Gain | 74.5% (919) | 59.6 (31) | 78.7 (328) | 75.4 (434) | 66.7 (126) | 83.9 (392) | 70.7 (376) | 64.3 (151) | 75.0 (628) | 73.0 (291) |
| Gained Physicians | 25.5 (315) | 40.4 (21) | 21.3 (89) | 24.7 (142) | 33.3 (63) | 16.0 (75) | 29.3 (156) | 35.7 (84) | 25.0 (209) | 27.0 (106) |
| Number Gained | | | | | | | | | | |
| 1 - 2 | 93.1 | 91.0 | 91.0 | 94.0 | 94.0 | 97.0 | 95.0 | 86.0 | 93.0 | 92.0 |
| 3 - 4 | 6.6 | 9.0 | 9.0 | 5.0 | 6.0 | 3.0 | 5.0 | 13.0 | 6.0 | 8.0 |
| 5 - 6 | 0.3 | - | - | 1.0 | - | - | - | 1.0 | 1.0 | - |
| 7 or More | - | - | - | - | - | - | - | - | - | - |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| TOTAL | | | | | | | | | | |
| Number | 1234 | 52 | 417 | 576 | 189 | 467 | 532 | 235 | 837 | 397 |
| Percent | 100% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

TABLE IV.3

DISTRIBUTION OF YOUNG PHYSICIANS BY SPECIALTY
AND YEAR OF GRADUATION

| Physician Category | Percent Locating | | |
|---|---|---|---|
| | Counties With Under 10,000 Population | Counties With 10,000-25,000 Population | Counties With Over 25,000 Population |
| **Specialty** | | | |
| GP | 11.7 | 44.0 | 44.3 |
| FP | 19.3 | 44.7 | 36.0 |
| IM | 6.3 | 33.3 | 60.4 |
| PD | 3.3 | 31.4 | 65.3 |
| **Year of Graduation** | | | |
| 1974 | 10.2 | 43.4 | 46.4 |
| 1975 | 11.9 | 38.8 | 49.3 |
| 1976 | 9.7 | 38.4 | 51.9 |
| 1977 | 9.5 | 39.0 | 51.5 |
| 1978 | 10.2 | 42.7 | 47.1 |

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TABLE IV.4(a)

MEAN COMMUNITY CHARACTERISTICS OF ALL NON-METROPOLITAN COUNTIES WITH LESS THAN 50,000 POPULATION, BY REGION, COUNTY POPULATION SIZE, AND MMSA STATUS

| Characteristics | All Counties | Region | | | | Population | | | MMSA Status | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | North | Central | South | West | Under 10,000 | 10,000-25,000 | Above 25,000 | Non-MMSA | Whole MMSA | Part-MMSA |
| Number of Counties | 2,112.00 | 60.00 | 795.00 | 968.00 | 289.00 | 740.00 | 909.00 | 463.00 | 878.00 | 837.00 | 397.00 |
| **Population** | | | | | | | | | | | |
| Population | 17,251.00 | 29,949.00 | 16,414.00 | 18,349.00 | 13,239.00 | 6,088.00 | 17,065.00 | 35,433.00 | 18,926.00 | 13,472.00 | 22,387.00 |
| Population Growth Rate | 13.88 | 14.78 | 6.00 | 16.10 | 27.95 | 10.70 | 15.42 | 16.00 | 13.21 | 13.27 | 16.66 |
| Percent White | 88.60 | 98.92 | 97.00 | 79.80 | 92.90 | 90.46 | 87.40 | 88.00 | 90.70 | 84.50 | 92.70 |
| Percent Black | 8.40 | .48 | .70 | 17.61 | .30 | 5.60 | 9.93 | 9.90 | 6.60 | 12.20 | 4.30 |
| Percent Spanish | 3.90 | .48 | .75 | 5.20 | 8.80 | 5.00 | 3.77 | 2.30 | 3.90 | 4.40 | 2.60 |
| Median School Years | 11.40 | 12.00 | 11.90 | 10.72 | 12.10 | 11.43 | 11.25 | 11.56 | 11.60 | 11.00 | 11.80 |
| Population Per Square Mile | 28.70 | 47.00 | 27.29 | 34.50 | 8.91 | 11.73 | 29.00 | 54.92 | 32.30 | 24.45 | 29.67 |
| **Cultural** | | | | | | | | | | | |
| Number Colleges and Universities | .12 | .42 | .15 | .10 | .08 | .02 | .10 | .33 | .17 | .04 | .20 |
| Per Capita Educational Expenditures | 320.90 | 341.00 | 348.40 | 272.93 | 402.20 | 363.60 | 300.90 | 291.91 | 315.50 | 316.10 | 343.00 |
| Number of Urban Contiguous Conties | .78 | 1.17 | .70 | .89 | .60 | .47 | .84 | 1.20 | .76 | .80 | .81 |
| **Economic** | | | | | | | | | | | |
| Per Capita Income | 5,359.00 | 5,407.00 | 5,798.00 | 4,862.00 | 5,810.00 | 5,371.00 | 5,269.00 | 5,518.00 | 5,736.00 | 4,870.00 | 5,555.00 |
| Household Income | 11,234.00 | 12,209.00 | 12,206.00 | 10,123.00 | 12,079.00 | 11,154.00 | 11,014.00 | 11,792.00 | 11,711.00 | 10,539.00 | 11,645.00 |
| Growth Rate of Per Capita Income | 59.90 | 59.60 | 51.26 | 65.74 | 63.90 | 59.50 | 59.35 | 61.50 | 60.83 | 59.60 | 58.41 |
| Unemployment Rate | 10.30 | 11.20 | 9.22 | 10.91 | 10.81 | 8.44 | 11.10 | 11.65 | 9.24 | 11.10 | 10.84 |
| Labor Force Participation Rate | 45.96 | 45.70 | 46.70 | 44.20 | 50.00 | 46.80 | 45.60 | 45.40 | 47.82 | 43.77 | 46.45 |
| Percent Labor Force Construction | 7.45 | 6.51 | 6.30 | 8.17 | 8.47 | 7.73 | 7.44 | 7.00 | 7.37 | 7.60 | 7.34 |
| Percent Labor Force White Collar | 37.40 | 40.80 | 37.20 | 36.20 | 41.40 | 35.00 | 37.42 | 41.24 | 38.91 | 34.73 | 39.80 |
| Percent Labor Force Manufacturing | 19.59 | 28.00 | 17.00 | 24.50 | 6.62 | 13.15 | 22.21 | 24.80 | 19.00 | 20.55 | 18.91 |
| Percent Working in State/ County of Residence | 78.00 | 76.53 | 81.00 | 72.80 | 87.40 | 78.43 | 76.61 | 80.12 | 81.50 | 73.10 | 80.83 |
| Percent Working in State/Not County of Residence | 19.20 | 19.53 | 16.50 | 24.10 | 10.17 | 18.80 | 20.50 | 17.24 | 16.36 | 23.60 | 16.10 |
| Percent Not Working in State of Residence | 2.80 | 3.95 | 2.40 | 3.10 | 2.47 | 2.65 | 2.91 | 2.64 | 2.17 | 3.22 | 3.10 |
| Percent Agricultural | 12.33 | 4.10 | 19.42 | 8.15 | 10.00 | 17.50 | 11.20 | 6.80 | 12.25 | 13.68 | 10.75 |
| Per Capita Farmer Income | 6,041.00 | 5,119.00 | 3,826.00 | 6,496.00 | 10,814.00 | 7,289.00 | 5,374.31 | 5,358.00 | 5,645.00 | 6,111.00 | 6,775.00 |
| Number of Farms | 657.00 | 437.00 | 851.00 | 593.00 | 383.00 | 412.00 | 737.00 | 892.46 | 720.00 | 563.00 | 718.00 |
| Farmland as Percent of Total Land | 6.08 | 2.48 | 7.83 | 5.26 | 4.74 | 6.63 | 6.00 | 5.38 | 6.73 | 5.81 | 5.20 |
| Occupied Housing Units Per Capita | .35 | .35 | .36 | .34 | .35 | .36 | .35 | .35 | .36 | .35 | .35 |
| Percent of Households Below Poverty Line | 14.00 | 9.61 | 11.28 | 17.40 | 11.16 | 14.91 | 14.31 | 12.00 | 12.30 | 16.85 | 11.90 |
| Percent Persons Below Poverty Line | 17.55 | 12.81 | 14.33 | 21.50 | 14.24 | 18.48 | 17.90 | 15.42 | 15.70 | 20.66 | 15.13 |
| Percent Households Lacking Complete Plumbing | 5.15 | 3.95 | 3.10 | 7.63 | 2.79 | 5.00 | 5.64 | 4.38 | 3.84 | 7.00 | 4.24 |
| Percent Population Receiving AFDC | 3.23 | 3.50 | 2.50 | 4.00 | 2.48 | 2.68 | 3.53 | 3.48 | 2.54 | 3.90 | 3.40 |

TABLE IV.4(a) (continued)

| Characteristics | All Counties | Region | | | | Population | | | HMSA Status | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | North | Central | South | West | Under 10,000 | 10,000-25,000 | Above 25,000 | Non-HMSA | Whole HMSA | Part-HMSA |
| **Health Resources** | | | | | | | | | | | |
| Number of R.N. Schools | .08 | .03 | .09 | .07 | .06 | .01 | .06 | .23 | .11 | .02 | .12 |
| Number of FTE R.N.s per 100,000 Population | 156.43 | 297.40 | 173.40 | 126.00 | 182.80 | 135.00 | 145.40 | 212.10 | 179.54 | 115.00 | 194.00 |
| Number of Physician Extenders per 100,000 Population | 4.40 | 8.83 | 4.90 | 3.00 | 6.80 | 5.32 | 4.00 | 3.74 | 3.73 | 4.20 | 6.33 |
| Number of Hospitals | 2.08 | 2.55 | 2.13 | 2.00 | 2.10 | 1.33 | 2.16 | 3.11 | 2.44 | 1.41 | 2.70 |
| Number of Hospital Beds | 149.71 | 250.97 | 159.20 | 147.30 | 110.63 | 57.29 | 139.30 | 318.30 | 186.60 | 84.30 | 206.00 |
| Number of Hospital Beds per 100,000 Population | 890.50 | 847.48 | 1,026.00 | 768.89 | 934.50 | 966.50 | 823.40 | 901.00 | 1,091.00 | 636.00 | 983.00 |
| Number of Neonatal ICU Beds per 100,000 Population | .15 | 1.40 | .19 | .05 | .08 | .00 | .20 | .31 | .20 | .02 | .33 |
| Local Per Capita Expenditures for Health | 6.17 | 3.39 | 7.70 | 4.75 | 7.38 | 11.41 | 4.00 | 2.10 | 6.44 | 6.56 | 4.75 |
| Total Number of M.D.s | 11.45 | 30.80 | 10.45 | 11.05 | 11.51 | 2.72 | 9.71 | 28.80 | 14.28 | 5.53 | 17.66 |
| Number of Primary Care M.D.s | 6.15 | 15.70 | 6.11 | 5.88 | 5.63 | 1.94 | 5.90 | 13.40 | 7.53 | 3.27 | 9.18 |
| **Health Resources** | | | | | | | | | | | |
| Total Number of D.O.s | .79 | 1.92 | 1.32 | .41 | .40 | .36 | .80 | 1.50 | 1.06 | .39 | 1.14 |
| Number of Primary Care D.O.s | .69 | 1.75 | 1.20 | .34 | .39 | .32 | .73 | 1.23 | .91 | .30 | 1.05 |
| M.D.s-to-100,000 Population | 56.21 | 109.32 | 53.54 | 51.20 | 69.32 | 92.10 | 55.50 | 80.21 | 68.80 | 35.23 | 72.60 |
| Primary Care MDs to 100,000 Population | 33.88 | 49.30 | 34.92 | 30.42 | 39.32 | 30.63 | 34.60 | 37.70 | 40.93 | 23.00 | 41.00 |
| D.O.s to 100,000 Population | 4.89 | 6.20 | 8.00 | 2.65 | 3.53 | 5.37 | 4.80 | 4.33 | 6.45 | 3.10 | 5.23 |
| Primary Care D.O.s to 100,000 Population | 4.34 | 5.73 | 7.20 | 2.28 | 3.24 | 4.85 | 4.41 | 3.46 | 5.77 | 2.70 | 4.77 |
| M.D. Interns and Residents | .30 | 2.10 | .22 | .27 | .21 | .06 | .34 | .60 | .27 | .19 | .60 |
| **Environment** | | | | | | | | | | | |
| January Temperature | 32.00 | 22.50 | 22.13 | 42.53 | 26.10 | 30.10 | 33.10 | 33.10 | 32.36 | 34.30 | 26.60 |
| July Temperature | 75.90 | 69.40 | 74.20 | 79.66 | 69.41 | 75.47 | 76.30 | 75.80 | 76.50 | 76.70 | 72.93 |
| January Precipitation | 2.40 | 2.65 | 1.30 | 3.43 | 1.70 | 1.73 | 2.61 | 2.88 | 2.13 | 2.70 | 2.17 |
| July Precipitation | 3.60 | 3.70 | 3.51 | 4.40 | 1.10 | 3.11 | 3.80 | 4.00 | 3.50 | 3.90 | 3.16 |
| Elevation in Feet | 1,446.00 | 764.00 | 1,287.00 | 801.10 | 4,197.00 | 2,086.00 | 1,180.00 | 945.00 | 1,473.00 | 1,349.00 | 1,592.00 |
| **Health Status** | | | | | | | | | | | |
| Fertility Rate | 7.90 | 6.61 | 8.10 | 7.53 | 8.91 | 8.29 | 7.90 | 7.31 | 7.81 | 8.00 | 7.85 |
| Percent of Births to Teenage Women | 8.58 | 6.42 | 6.36 | 11.33 | 5.84 | 7.82 | 9.11 | 8.73 | 8.22 | 9.56 | 7.31 |
| Infant Mortality Rate | 156.62 | 126.00 | 137.25 | 179.84 | 138.52 | 151.23 | 159.80 | 159.00 | 134.80 | 163.48 | 146.17 |
| Deaths per 100,000 Population | 1,012.00 | 980.00 | 1,078.50 | 1,014.93 | 827.00 | 1,051.75 | 1,017.00 | 939.00 | 1,035.00 | 1,002.00 | 982.80 |
| Deaths per 100,000 - from Infective/ Parasitic Diseases | 6.79 | 6.35 | 5.31 | 8.51 | 5.53 | 6.02 | 7.45 | 6.74 | 6.41 | 7.28 | 6.62 |
| Deaths per 100,000 - from Influenza/Pneumonia | 26.34 | 22.10 | 30.00 | 25.31 | 20.70 | 27.85 | 26.90 | 22.90 | 27.46 | 25.73 | 22.20 |





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TABLE IV.4(a) (continued)

| Characteristics | All Counties | Region | | | | Population | | | HMSA Status | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | North | Central | South | West | Under 10,000 | 10,000-25,000 | Above 25,000 | Non-HMSA | Whole HMSA | Part-HMSA |
| **Health Status** | | | | | | | | | | | |
| Deaths per 100,000 - from Cardio-Vascular Conditions | 527.70 | 510.50 | 588.00 | 523.00 | 379.14 | 584.14 | 533.31 | 484.00 | 547.00 | 518.00 | 506.00 |
| Incidence of Measles per 100,000 Population | 6.03 | 9.74 | 7.73 | 4.75 | 4.87 | 4.88 | 6.23 | 7.48 | 6.66 | 4.26 | 8.40 |
| Incidence of Mumps per 100,000 Population | 7.70 | 4.86 | 5.74 | 10.64 | 3.85 | 5.53 | 9.13 | 8.37 | 10.00 | 6.92 | 4.37 |
| Incidence of Rubella per 100,000 Population | 4.57 | 5.54 | 6.71 | 2.26 | 6.27 | 4.00 | 4.33 | 6.00 | 5.29 | 2.66 | 7.00 |
| **Health Utilization** | | | | | | | | | | | |
| Inpatient Hospital Visits per 100,000 Pop. | 99,625.00 | 115,776.00 | 113,424.00 | 87,890.00 | 97,621.00 | 95,490.00 | 95,159.00 | 115,024.00 | 122,866.00 | 67,402.00 | 115,994.00 |
| Outpatient Hospital Visits per 100,000 Pop. | 57,740.00 | 118,872.00 | 58,198.00 | 47,273.00 | 78,850.00 | 45,216.00 | 55,874.00 | 81,444.00 | 64,443.00 | 40,748.00 | 78,654.00 |
| Emergency Hospital Visits per 100,000 Pop. | 22,933.00 | 35,337.00 | 19,886.00 | 23,754.00 | 25,980.00 | 16,548.00 | 23,302.00 | 32,398.00 | 26,518.00 | 16,520.00 | 28,509.00 |
| Inpatient Surgical Operations per 100,000 Pop. | 708.64 | 1,490.50 | 744.00 | 681.00 | 541.00 | 134.00 | 523.00 | 1,992.00 | 975.00 | 285.00 | 1,011.00 |
| Total Surgical Operations per 100,000 Pop. | 3,712.00 | 6,800.00 | 4,122.00 | 3,292.00 | 3,353.00 | 2,371.00 | 3,435.00 | 6,398.00 | 4,982.00 | 1,886.00 | 4,750.00 |
| **Crime** | | | | | | | | | | | |
| Number of Murders per 100,000 Population | 4.96 | 2.32 | 2.04 | 7.45 | 5.22 | 4.60 | 5.00 | 5.48 | 4.62 | 5.54 | 4.30 |
| Number of Rapes per 100,000 Population | 6.70 | 6.14 | 5.10 | 7.10 | 9.93 | 5.38 | 6.90 | 8.45 | 6.50 | 6.00 | 8.60 |
| Number of Burglaries per 100,000 Population | 520.00 | 893.00 | 544.10 | 406.44 | 756.54 | 453.62 | 519.40 | 627.40 | 499.35 | 427.00 | 761.20 |

TABLE IV.4(b)

MEAN CHARACTERISTICS OF COUNTIES WHICH DID AND DID NOT
GAIN ALL YOUNG PHYSICIANS, AND NON-NHSC YOUNG PHYSICIANS

| Characteristics | All Young Physicians | | Non-NHSC Young Physicians | |
|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain |
| Number of Counties | 1,219.00 | 893.00 | 1,121.00 | 991.00 |
| **Population** | | | | |
| Population | 22,029.00* | 10,721.00* | 22,711.00* | 11,068.00* |
| Population Growth Rate | 15.60* | 11.52* | 15.50* | 12.05* |
| Percent White | 88.50 | 88.73 | 88.94 | 88.22 |
| Percent Black | 8.86 | 8.00 | 8.30 | 8.48 |
| Percent Spanish | 3.25* | 4.74* | 3.16* | 4.69* |
| Median School Years | 11.46* | 11.27* | 11.49* | 11.26* |
| Population Per Square Mile | 35.10* | 19.90* | 35.94* | 20.45* |
| **Cultural** | | | | |
| Number Colleges and Universities | .19* | .04* | .19* | .04* |
| Per Capita Educational Expenditures | 312.30* | 332.64* | 310.94* | 332.16* |
| Number of Urban Contiguous Conties | .86* | .68* | .86* | .70* |
| **Economic** | | | | |
| Per Capita Income | 5,422.00* | 5,274.00* | 5,462.00* | 5,242.00* |
| Household Income | 11,381.00* | 11,034.00* | 11,464.00* | 10,975.00* |
| Growth Rate of Per Capita Income | 60.15 | 59.49 | 60.20 | 59.30 |
| Unemployment Rate | 10.78* | 9.56* | 10.70* | 9.70* |
| Percent of Unemployed Persons Out Of Work 15+ Weeks | | | | |
| Labor Force Participation Rate | 46.19 | 45.63 | 46.36* | 45.51* |
| Percent Labor Force Construction | 7.42 | 7.48 | 7.39 | 7.52 |
| Percent Labor Force White Collar | 39.22* | 34.93* | 39.49* | 35.05* |
| Percent Labor Force Manufacturing | 21.10* | 17.53* | 21.02* | 17.98* |
| Percent Working in State/County of Residence | 79.63* | 75.81* | 80.38* | 75.34* |
| Percent Working in State/Not County of Residence | 17.60* | 21.34* | 16.94* | 21.71* |
| Percent Not Working in State of Residence | 2.78 | 2.73 | 2.68 | 2.85 |
| Percent Agricultural | 9.90* | 16.10* | 9.87* | 15.55* |
| Per Capita Farmer Income | 6,262.00 | 5,739.00 | 5,761.00 | 6,360.00 |
| Number of Farms | 733.00* | 533.00* | 747.00* | 556.00* |
| Farmland as Percent of Total Land | 5.70* | 6.60* | 5.71* | 6.30* |
| Occupied Housing Units Per Capita | .35 | .35 | .35 | .35 |
| Percent of Families Below Poverty Line | 13.16* | 15.19* | 12.93* | 15.25* |
| Percent Persons Below Poverty Line | 16.65* | 18.79* | 16.41* | 18.85* |
| Percent Households Lacking Complete Plumbing | 5.01 | 5.34 | 4.86* | 5.48* |
| Percent Population Receiving AFDC | 3.37* | 3.03* | 3.27 | 3.17 |
| **Health Resources** | | | | |
| Number of R.N. Schools | .12* | .01* | .13* | .02* |
| Number of FTE R.N.s per 100,000 Population | 181.00* | 123.00* | 186.00* | 123.00* |
| Number of Physician Extenders per 100,000 Population | 4.62 | 4.10 | 4.59 | 4.19 |
| Number of Hospitals | 2.48* | 1.33* | 2.58* | 1.31* |
| Number of Hospital Beds | 199.00* | 82.40* | 209.00* | 82.00* |
| Number of Hospital Beds per 100,000 Population. | 932.80* | 832.70* | 967.90* | 802.95* |
| Number of Neonatal ICU Beds per 100,000 Population | .24* | .02* | .26* | .02* |
| Local Per Capita Expenditures for Health | 4.42* | 8.56* | 4.32* | 8.26* |
| Total Number of M.D.s | 16.30* | 4.35* | 17.45* | 4.66* |
| Number of Primary Care M.D.s | 8.41* | 3.10* | 8.83* | 3.13* |
| Total Number of D.O.s | 1.02 | .75 | .95* | .62* |



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TABLE IV.4(b) (continued).

| Characteristics | All Young Physicians | | Non-NHSC Young Physicians | |
|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain |
| **Health Resources** | | | | |
| Number of Primary Care D.O.s | .88* | .66* | .81* | .57* |
| M.D.s-to-100,000 Population | 69.38* | 38.21* | 72.25* | 38.05* |
| Primary Care MDs to 100,000 Population | 38.06* | 26.14* | 39.39* | 27.62* |
| D.O.s to 100,000 Population | 4.48* | 5.54* | 4.23* | 5.63* |
| Primary Care D.O.s to 100,000 Population | 3.84* | 5.06* | 3.73* | 5.07* |
| M.D. Interns and Residents | .43* | .11* | .46* | .11* |
| **Environment** | | | | |
| January Temperature | 31.60 | 32.50 | 31.50* | 32.61* |
| July Temperature | 75.50* | 76.50* | 75.41* | 76.51* |
| January Precipitation | 2.53* | 2.13* | 2.53* | 2.17* |
| July Precipitation | 3.65 | 3.53 | 3.63 | 3.56 |
| Elevation in Feet | 1,343.00* | 1,588.00* | 1,350.00* | 1,555.00* |
| **Health Status** | | | | |
| Fertility Rate | 7.70* | 8.10* | 7.70* | 8.10* |
| Percent of Births to Teenage Women | 8.53 | 8.69 | 8.45 | 8.72 |
| Infant Mortality Rate | 156.00 | 157.50 | 155.13 | 158.50 |
| Deaths per 100,000 Population | 991.00* | 1041.00* | 989.00* | 1038.00* |
| Deaths per 100,000 - from Infective /Parasitic Diseases | 7.01 | 6.42 | 7.03 | 6.53 |
| Deaths per 100,000 - from Influenza/Pneumonia | 26.20 | 26.50 | 26.72 | 26.23 |
| Deaths per 100,000 - from Cardio-Vascular Conditions | 513.10* | 547.70* | 512.20* | 544.60* |
| Incidence of Measles per 100,000 Population | 7.25* | 4.38* | 7.53* | 4.34* |
| Incidence of Mumps per 100,000 Population | 7.59 | 7.85 | 7.73 | 7.67 |
| Incidence of Rubella per 100,000 Population | 5.40 | 3.46 | 5.64 | 3.37 |
| **Health Utilization** | | | | |
| Inpatient Hospital Visits per 100,000 Pop. | 110,680.00* | 84,529.00* | 115,094.00* | 82,123.00* |
| Outpatient Hospital Visits per 100,000 Pop. | 70,626.00* | 40,146.00* | 72,885.00* | 40,607.00* |
| Emergency Hospital Visits per 100,000 Pop. | 27,531.00* | 16,649.00* | 28,505.00* | 16,623.00* |
| Inpatient Surgical Operations per 100,000 Pop. | 1,041.00* | 254.60* | 1,010.00* | 254.60* |
| Total Surgical Operations per 100,000 Pop. | 4,698.00* | 2365.00* | 4,932.00* | 2,331.50* |
| **Crime** | | | | |
| Number of Murders per 100,000 Population | 4.98 | 4.94 | 5.04 | 4.87 |
| Number of Rapes per 100,000 Population | 7.21* | 6.00* | 7.32* | 6.00* |
| Number of Burglaries per 100,000 Population | 588.10* | 427.10* | 588.10* | 443.00* |

*Difference is significant at the $p < .05$ level, using a two-tailed t-test.



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TABLE IV.4(c)

MEAN CHARACTERISTICS OF COUNTIES WHICH DID AND DID NOT GAIN PHYSICIANS WITH NHSC EXPERIENCE

| Characteristics | NHSC Alumni | | NHSC Alumni M.D.s | | NHSC Alumni D.O.s | |
|---|---|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| Number of Counties | 302.00 | 1,810.00 | 274.00 | 1,838.00 | 40.00 | 2,071.00 |
| **Population** | | | | | | |
| Population | 21,539.00* | 16,535.00* | 21,962.00* | 16,548.00* | 20,205.00 | 17,194.00 |
| Population Growth Rate | 17.64* | 13.25* | 17.95* | 13.27* | 16.81 | 13.82 |
| Percent White | 85.66* | 89.10* | 85.20* | 89.11* | 90.10 | 88.60 |
| Percent Black | 9.76 | 8.15 | 10.30 | 8.10 | 4.19* | 8.46* |
| Percent Spanish | 4.64 | 3.75 | 4.93 | 3.72 | 3.98 | 3.88 |
| Median School Years | 11.35 | 11.39 | 11.30 | 11.39 | 11.80* | 11.37* |
| Population Per Square Mile | 31.41* | 28.25* | 32.37* | 28.15* | 24.00 | 28.79 |
| **Cultural** | | | | | | |
| Number Colleges and Universities | .18* | .11* | .19* | .11* | .12 | .12 |
| Per Capita Educational Expenditures | 329.16 | 319.51 | 328.42 | 319.77 | 340.08 | 320.37 |
| Number of Urban Contiguous Conties | .90* | .76* | .90 | .77 | .88 | .78 |
| **Economic** | | | | | | |
| Per Capita Income | 5,110.00* | 5,401.00* | 5,065.00* | 5,403.00* | 5,410.00 | 5,358.00 |
| Household Income | 10,794.00* | 11,308.00* | 10,734.00* | 11,309.00* | 11,168.00 | 11,235.00 |
| Growth Rate of Per Capita Income | 59.94 | 59.86 | 60.49 | 59.78 | 55.95 | 59.95 |
| Unemployment Rate | 12.00* | 9.90* | 12.12* | 10.00* | 11.30 | 10.25 |
| Labor Force Participation Rate | 44.71* | 46.17* | 44.59* | 46.16* | 45.90 | 45.96 |
| Percent Labor Force Construction | 7.53 | 7.44 | 7.54 | 7.44 | 7.49 | 7.45 |
| Percent Labor Force White Collar | 36.83* | 37.17* | 39.04* | 37.16* | 37.81 | 37.40 |
| Percent Labor Force Manufacturing | 20.73 | 19.40 | 20.92 | 19.40 | 19.38 | 19.60 |
| Percent Working in State/County of Residence | 77.10 | 78.17 | 77.72 | 78.13 | 77.23 | 78.03 |
| Percent Working in State/Not County of Residence | 19.77 | 19.10 | 19.70 | 19.10 | 19.06 | 19.18 |
| Percent Not Working in State of Residence | 3.15 | 2.69 | 3.09 | 2.71 | 3.71 | 2.74 |
| Percent Agricultural | 8.60* | 13.20* | 7.80* | 13.20* | 13.50 | 12.50 |
| Per Capita Farmer Income | 7,781.00 | 5,751.00 | 7,858.00 | 5,770.00 | 6,839.00 | 6,026.00 |
| Number of Farms | 647.00 | 659.00 | 619.00 | 663.00 | 862.00* | 655.00* |
| Farmland as Percent of Total Land | 4.83* | 6.30* | 4.63* | 6.30* | 6.15 | 6.07 |
| Occupied Housing Units Per Capita | .34* | .35* | .34* | .35* | .36 | .35 |
| Percent of Households Below Poverty Line | 14.59 | 13.92 | 14.80* | 13.90* | 12.63 | 14.05 |
| Percent Persons Below Poverty Line | 18.18 | 17.45 | 18.41* | 17.42* | 15.83 | 17.59 |
| Percent Households Lacking Complete Plumbing | 6.10* | 5.00* | 6.33* | 4.97* | 4.41 | 5.16 |
| Percent Population Receiving AFDC | 4.18* | 3.06* | 4.30* | 3.07* | 3.25 | 3.22 |
| **Health Resources** | | | | | | |
| Number of R.N. Schools | .10 | .07 | .10 | .07 | .05 | .08 |
| Number of FTE R.N.s per 100,000 Population | 171.53* | 153.91* | 176.29* | 153.42* | 137.95 | 156.79 |
| Number of Physician Extenders per 100,000 Population | 6.42* | 4.06* | 6.74* | 4.09* | 5.83 | 4.37 |
| Number of Hospitals | 2.24* | 2.05* | 2.26* | 2.05* | 1.98 | 2.08 |
| Number of Hospital Beds | 167.63* | 146.73* | 172.36* | 146.34* | 137.90 | 149.94 |
| Number of Hospital Beds per 100,000 Population | 734.66* | 916.44* | 745.57* | 912.05* | 636.92* | 895.41* |
| Number of Neonatal ICU Beds per 100,000 Population | .04 | .17 | .05 | .16 | 0.00* | .19* |
| Local Per Capita Expenditures for Health | 3.96* | 6.34* | 3.93* | 6.30* | 3.71* | 6.22* |
| Total Number of M.D.s | 14.79* | 10.89* | 15.38* | 10.86* | 11.70 | 11.40 |
| Number of Primary Care M.D.s | 7.39* | 5.95* | 7.59* | 5.94* | 6.40 | 6.15 |
| Total Number of D.O.s | 1.01 | .75 | .94 | .97 | 1.65* | .78* |
| Number of Primary Care D.O.s | .88 | .66 | .86 | .67 | 1.25* | .68* |
| M.D.s-to-100,000 Population | 60.52* | 55.49* | 62.34* | 55.29* | 49.21 | 56.34 |

continued--



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TABLE IV.4(c) (continued)

| Characteristics | NHSC Alumni | | NHSC Alumni M.D.s | | NHSC Alumni D.O.s | |
|---|---|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| **Health Resources** | | | | | | |
| Primary Care MDs to 100,000 Population | 31.78* | 34.22* | 32.42 | 34.09 | 27.01* | 34.00* |
| D.O.s to 100,000 Population | 4.87 | 4.88 | 5.92 | 5.03 | 11.75* | 4.75* |
| Primary Care D.O.s to 100,000 Population | 4.04 | 4.41 | 3.73 | 4.45 | 7.23 | 4.30 |
| M.D. Interns and Residents | .36 | .29 | .38 | .28 | .20 | .30 |
| **Environment** | | | | | | |
| January Temperature | 31.80 | 32.10 | 32.00 | 32.04 | 28.51* | 32.10* |
| July Temperature | 74.90* | 76.10* | 74.82* | 76.09* | 74.40 | 75.95 |
| January Precipitation | 2.54* | 2.33* | 2.58* | 2.33* | 2.07 | 2.37 |
| July Precipitation | 3.55 | 3.60 | 3.58* | 3.60* | 3.20 | 3.60 |
| Elevation in Feet | 1,457.00 | 1,444.00 | 1,465.00 | 1,443.00 | 1,467.00 | 1,446.00 |
| **Health Status** | | | | | | |
| Fertility Rate | 7.75 | 7.92 | 7.73 | 7.92 | 7.72 | 7.91 |
| Percent of Births to Teenage Women | 8.90 | 8.52 | 8.98* | 8.52* | 8.12 | 8.59 |
| Infant Mortality Rate | 162.10 | 155.71 | 163.30 | 155.63 | 152.47 | 156.71 |
| Deaths per 100,000 Population | 971.00* | 1,019.00* | 961.00* | 1,020.00* | 1,033.00 | 1,012.00 |
| Deaths per 100,000 - from Infective /Parasitic Diseases | 7.90* | 6.60* | 8.04* | 6.60* | 6.75 | 6.79 |
| Deaths per 100,000 - from Influenza/Pneumonia | 24.00 | 26.70* | 24.23 | 26.66 | 24.42 | 26.38 |
| Deaths per 100,000 - from Cardio-Vascular Conditions | 489.00* | 534.00* | 483.36* | 534.32* | 526.70 | 527.72 |
| Incidence of Measles per 100,000 Population | 3.94* | 6.38* | 4.13 | 6.32 | 3.91 | 6.07 |
| Incidence of Mumps per 100,000 Population | 5.26 | 8.11 | 5.41 | 8.04 | 3.46 | 7.78 |
| Incidence of Rubella per 100,000 Population | 5.95 | 4.34 | 6.07 | 4.35 | 4.56 | 4.58 |
| **Health Utilization** | | | | | | |
| Inpatient Hospital Visits per 100,000 Pop. | 86,142.00* | 101,868.00* | 88,212.00* | 101,321.00* | 69,757.00* | 100,201.00* |
| Outpatient Hospital Visits per 100,000 Pop. | 71,662.00* | 55,415.00* | 71,923.00* | 55,623.00* | 66,653.00 | 57,568.00 |
| Emergency Hospital Visits per 100,000 Pop. | 25,850.00* | 22,446.00* | 26,311.00* | 22,428.00* | 23,115.00 | 22,929.00 |
| Inpatient Surgical Operations per 100,000 Pop. | 803.00 | 693.00 | 831.00* | 690.00* | 633.00 | 710.00 |
| Total Surgical Operations per 100,000 Pop. | 3,554.00 | 3,739.00 | 3,639.00 | 3,723.00 | 2,904.00 | 3,778.00 |
| **Crime** | | | | | | |
| Number of Murders per 100,000 Population | 5.66 | 4.84 | 5.97 | 4.81 | 2.81* | 5.00* |
| Number of Rapes per 100,000 Population | 7.86* | 6.50* | 8.16* | 6.48* | 7.03 | 6.69 |
| Number of Burglaries per 100,000 Population | 655.10* | 497.50* | 675.93* | 496.77* | 589.07 | 518.68 |

*Difference is significant at the $p < .05$ level, using a one-tailed t-test.



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TABLE IV.4(d)

MEAN CHARACTERISTICS OF HMSA COUNTIES WHICH DID AND DID NOT GAIN PPO PHYSICIANS

| Characteristics | PPOs | | PPO MDs | | PPO DOs | |
|---|---|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| Number of Counties | 315 | 918 | 245 | 988 | 83 | 1150 |
| **Population** | | | | | | |
| Population | 19,606.0* | 15,223.0* | 20,635.0* | 15,278.0* | 17,088.1 | 16,289.0 |
| Population Growth Rate | 18.6* | 12.9* | 19.5* | 13.1* | 15.8 | 14.3 |
| Percent White | 87.6 | 86.9 | 86.7 | 87.2 | 90.7* | 86.8* |
| Percent Black | 9.5 | 9.7 | 10.2 | 9.5 | 6.7 | 9.8 |
| Percent Spanish | 3.4 | 4.0 | 3.7 | 3.9 | 2.6 | 3.9 |
| Median School Years | 11.3 | 11.2 | 11.3 | 11.2 | 11.4 | 11.2 |
| Population Per Square Mile | 29.2* | 25.1* | 30.7* | 25.0* | 25.0 | 26.2 |
| **Cultural** | | | | | | |
| Number of Colleges and Universities | .12 | .08 | .12 | .08 | .11 | .09 |
| Per Capita Educational Expenditures | 326.1 | 324.2 | 330.0 | 323.4 | 323.9 | 324.8 |
| Number of Urban Contiguous Counties | .88 | .78 | .93* | .77* | .69 | .81 |
| **Economic** | | | | | | |
| Per Capita Income | 5,116.62 | 5,082.19 | 5,124.96 | 5,082.56 | 5,109.05 | 5,089.69 |
| Household Income | 10,847.50 | 10,911.14 | 10,931.73 | 10,885.77 | 10,585.35 | 10,917.21 |
| Growth Rate of Per Capita Income | 61.6* | 58.4* | 61.2* | 58.7* | 62.5 | 58.9 |
| Unemployment Rate | 11.9* | 10.7* | 12.2* | 10.7* | 11.3 | 10.9 |
| Labor Force Participation Rate | 45.0 | 44.5 | 44.9 | 44.6 | 45.7 | 44.6 |
| Percent Labor Force Construction | 7.6 | 7.5 | 7.7 | 7.5 | 7.8 | 7.5 |
| Percent Labor Force White Collar | 37.6* | 35.9* | 38.0* | 35.9* | 36.5 | 36.3 |
| Percent Labor For Manufacturing | 20.5 | 19.9 | 20.7 | 19.9 | 18.9 | 20.1 |
| Percent Working in State/County of Residence | 76.8 | 75.1 | 77.3* | 75.1* | 76.6 | 75.5 |
| Percent Working in State/Not County of Residence | 19.5* | 21.7* | 19.2* | 21.7* | 19.5 | 21.3 |
| Percent Not Working in State | 3.0 | 3.0 | 3.5 | 3.1 | 3.9 | 3.1 |
| Percent Agricultural | 9.9* | 13.7* | 9.1* | 13.6* | 12.4 | 12.8 |
| Per Capita Farm Income | 6,734.43 | 6,183.44 | 7,032.17 | 6,148.61 | 5,314.60 | 6,397.26 |
| Number of Farms | 638.0 | 604.0 | 631.0 | 608.0 | 662.0 | 609.0 |
| Farmland as Percent of Total Land | 4.9* | 5.9* | 4.6* | 5.9* | 5.9 | 5.6 |
| Occupied Housing Units Per Capita | .35 | .35 | .35 | .35 | .36 | .35 |
| Pecent of Families Below Poverty Line | 14.2* | 15.6* | 14.0* | 15.6* | 14.5 | 15.3 |
| Percent Persons Below Poverty Line | 17.7* | 19.3* | 17.4* | 19.2* | 18.2 | 18.9 |
| Percent Households Lacking Complete Plumbing | 6.1 | 6.0 | 6.2 | 6.1 | 5.7 | 6.1 |
| Percent Population Receiving AFDC | | | | | | |
| **Health Resources** | | | | | | |
| Number of RN Schools | .06 | .04 | .07 | .05 | .06 | .05 |
| Number of FTE RNs/100,000 Pop. | 150.0* | 136.9* | 158.3* | 135.4* | 131.6 | 140.6 |
| Number of Physician Extenders/100,000 Pop. | 6.2* | 4.4* | 6.8* | 4.4* | 4.3 | 4.9 |
| Number of Hospitals | 2.2* | 1.7* | 2.3* | 1.7* | 1.9 | 1.8 |
| Number of Hospital Beds | 144.9* | 116.1* | 153.6* | 116.0* | 125.7 | 123.3 |
| Number of Hospital Beds/100,000 Pop. | 802.6 | 729.1 | 786.0 | 738.4 | 857.2 | 740.0 |
| Number of Neonatal ICU Beds/Pop. | .04 | .15 | .05 | .14 | .00 | .13 |
| Local Per Capita Expenditures for Health | 4.70* | 6.42* | 4.32* | 6.39* | 5.65 | 6.00 |
| Total Number of MDs | 11.0* | 8.9* | 12.3* | 8.7* | 7.97 | 9.97 |
| Number of Primary Care MDs | 6.1* | 4.9* | 6.7* | 4.8* | 4.5 | 5.2 |
| **Health Resources** | | | | | | |
| Total Number of DOs | .81* | .54* | .56 | .62 | 1.69* | .52* |
| Number of Primary Care DOs | .67* | .49* | .50 | .55 | 1.31* | .48* |
| MDs to 100,000 Population | 50.8 | 46.1 | 55.3* | 45.3* | 37.0* | 48.0* |
| Primary Care MDs to 100,000 Pop. | 30.3 | 28.3 | 31.9* | 28.1* | 24.9* | 29.1* |
| DOs to 100,000 Population | 4.5 | 3.5 | 2.6* | 4.1* | 10.9* | 3.2* |
| Primary Care DOs to 100,000 Pop. | 3.6 | 3.3 | 2.3* | 3.6* | 8.1* | 3.0* |
| MD Interns and Residents | .28 | .33 | .33 | .31 | .12* | .32* |
| **Environment** | | | | | | |
| January Temperature | 31.6 | 31.9 | 31.4 | 31.9 | 31.2 | 31.8 |
| July Temperature | 74.8* | 75.7* | 74.4* | 75.8* | 75.6 | 75.5 |
| January Precipitation | 2.6 | 2.5 | 2.7 | 2.5 | 2.3 | 2.5 |
| July Precipitation | 3.6 | 3.7 | 3.7 | 3.6 | 3.5 | 3.7 |
| Elevation in Feet | 1,473.9 | 1,410.8 | 1,488.66 | 1,411.6 | 1,441.6 | 1,452.8 |



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Table IV.4(d)
Continued

| Characteristics | PPOs | | PPO MDs | | PPO DOs | |
|---|---|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| **Health Status** | | | | | | |
| Fertility Rate | 7.83 | 8.02 | 7.80 | 8.01 | 7.80 | 8.00 |
| Percent Births to Teenagers | 8.88 | 8.82 | 8.84 | 8.83 | 8.90 | 8.80 |
| Infant Mortality Rate | 159.61 | 157.34 | 159.81 | 157.45 | 156.37 | 158.01 |
| Deaths Per 100,000 Pop. | 995.86 | 995.64 | 978.76 | 999.89 | 1,045.47 | 992.11 |
| Death Rate/Infective and Parasitic | 7.26 | 7.00 | 7.42 | 6.98 | 6.71 | 7.09 |
| Death Rate/Influenza and Pneumonia | 24.38 | 25.88 | 23.96 | 25.94 | 26.16 | 25.50 |
| Death Rate/Cardiovascular Condition | 510.82 | 515.19 | 502.25 | 517.00 | 539.04 | 512.27 |
| Incidence of Measles | 4.56 | 5.94 | 4.94 | 5.75 | 5.24 | 5.61 |
| Incidence of Mumps | 4.84 | 6.53 | 5.58 | 6.23 | 2.18* | 6.38* |
| Incidence of Rubella | 4.53 | 3.91 | 3.27 | 4.26 | 8.06 | 3.78 |
| **Health Services Utilization** | | | | | | |
| Inpatient Hospital Visit Rate | 91,838.2* | 80,045.7* | 91,702.3 | 80,915.7 | 93,164.0 | 82,330.0 |
| Outpatient Hospital Visit Rate | 83,031.8* | 49,504.4* | 62,918.5* | 50,491.9* | 64,319.5 | 52,142.7 |
| Emergency Hospital Visit Rate | 25,896.5* | 18,487.1* | 26,621.3* | 18,832.3* | 24,775.8* | 20,062.7* |
| Inpatient Surgical Operation Rate | 559.8 | 505.1 | 622.2* | 493.5* | 402.7* | 527.5* |
| Total Surgical Operation Rate | 2,881.4 | 2,783.2 | 3,090.5 | 2,738.3 | 2,358.0 | 2,840.8 |
| **Crime** | | | | | | |
| Number of Murders Per 100,000 Pop. | 5.9 | 4.9 | 6.3* | 4.9* | 4.9 | 5.2 |
| Number of Rapes Per 100,000 Pop. | 8.4* | 6.3* | 8.4* | 6.5* | 8.6 | 6.7 |
| Number of Burglaries Per 100,000 Pop. | 640.5* | 498.5* | 669.9* | 501.2* | 597.1 | 530.2 |

*Difference is significant at the $p < .05$ level, using a two-tailed t-test.



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TABLE IV.5(a)

MEAN CHARACTERISTICS OF COUNTIES WHICH DID AND DID NOT GAIN ALL YOUNG PHYSICIANS, BY REGION

| Characteristics | North Region | | Central Region | | South Region | | West Region | |
|---|---|---|---|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| Number of Counties | 55.00 | 5.00 | 436.00 | 359.00 | 553.00 | 415.00 | 173.00 | 714.00 |
| **Population** | | | | | | | | |
| Population | 31,810.00* | 9,487.00* | 21,325.00* | 10,931.00* | 23,003.00* | 12,146.00* | 17,631.00* | 6,496.00* |
| Population Growth Rate | 14.25 | 20.60 | 7.63* | 4.06* | 17.23* | 14.50* | 30.77 | 23.63 |
| Percent White | 98.88 | 99.24 | 97.38 | 96.45 | 79.60 | 80.09 | 91.23* | 95.45* |
| Percent Black | .50 | .24 | .72 | .64 | 18.34 | 16.63 | .40* | .14* |
| Percent Spanish | .48 | .56 | .75 | .76 | 3.53* | 7.40* | 9.42 | 7.83 |
| Median School Years | 12.00 | 12.00 | 11.95* | 11.79* | 10.81* | 10.61* | 12.15* | 12.02* |
| Population Per Square Mile | 49.05* | 24.40* | 34.33* | 18.72* | 41.67 | 24.84 | 11.15 | 5.35 |
| **Cultural** | | | | | | | | |
| Number Colleges and Universities | .45* | 0.00* | .23* | .04* | .14* | .04* | .12* | .01* |
| Per Capita Educational Expenditures | 342.47 | 321.48 | 344.02 | 333.70 | 259.82* | 290.44* | 390.00* | 421.40* |
| Number of Urban Contiguous Counties | 1.16 | 1.20 | .80* | .58* | .94 | .82 | .69* | .46* |
| **Economic** | | | | | | | | |
| Per Capita Income | 5,422.00 | 5,235.00 | 5,989.00* | 5,565.40* | 4,824.50 | 4,912.00 | 5,894.00 | 5,680.00 |
| Household Income | 12,253.00 | 11,725.00 | 12,454.00* | 11,904.00* | 10,210.00 | 10,007.00 | 12,129.00 | 12,003.00 |
| Growth Rate of Per Capita Income | 59.74 | 57.77 | 53.00* | 49.13* | 64.80 | 67.00 | 63.37 | 64.73 |
| Unemployment Rate | 10.70 | 15.90 | 9.70* | 8.70* | 11.44* | 10.21* | 11.53* | 9.68* |
| Labor Force Participation Rate | .45 | .48 | 47.40* | 45.80* | 44.00 | 44.50 | 50.31 | 49.47 |
| Percent Labor Force Construction | 6.34 | 8.38 | 6.22 | 6.36 | 8.12 | 8.23 | 8.97 | 8.30 |
| Percent Labor Force White Collar | 40.65 | 42.20 | 39.58* | 38.26* | 37.30* | 34.71* | 43.92* | 37.50* |
| Percent Labor Force Manufacturing | 28.06 | 26.88 | 19.00* | 14.56* | 25.83* | 22.75* | 9.23 | 7.67 |
| Percent Working in State /County of Residence | 77.99 | 60.42 | 82.37* | 79.38* | 74.93* | 70.07* | 88.17 | 86.13 |
| Percent Working in State /Not County of Residence | 18.80 | 27.58 | 15.31* | 17.90* | 21.89* | 26.95* | 9.30 | 11.48 |
| Percent Not Working in State of Residence | 3.22 | 12.00 | 2.33 | 2.44 | 3.17 | 2.98 | 2.52 | 2.39 |
| Percent Agricultural | 4.20 | 3.50 | 15.74* | 23.90* | 6.88* | 9.84* | 7.70* | 19.80* |
| Per Capita Farmer Income | 4960.00 | 6868.00 | 4049.00 | 3,334.00 | 6439.00 | 6571.00 | 11,626.00 | 9,356.00 |
| Number of Farms | 464.00* | 142.00* | 955.00* | 727.00* | 682.00* | 476.00* | 432.00* | 305.00* |
| Farmland as Percent of Total Land | 2.48 | 2.58 | 7.62* | 8.09* | 4.91* | 5.72* | 4.36* | 5.32* |
| Occupied Housing Units Per Capita | .35 | .37 | .36 | .36 | .34 | .34 | .35 | .36 |
| Percent of Households Below Poverty Line | 9.63 | 9.38 | 9.98* | 12.87* | 16.86* | 18.11* | 10.50* | 12.17* |
| Percent Persons Below Poverty Line | 12.89 | 11.94 | 12.93* | 16.03* | 20.89* | 22.25* | 13.69* | 15.09* |
| Percent Households Lacking Complete Plumbing | 4.00 | 3.20 | 2.80* | 3.40* | 7.60 | 7.70 | 2.70 | 2.90 |
| Percent Population Receiving AFDC | 3.56 | 2.95 | 2.62 | 2.36 | 4.09 | 3.93 | 2.88* | 1.88* |

continued--







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Table IV.3(a) continued

| Characteristics | North Region | | Central Region | | South Region | | West Region | |
|---|---|---|---|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| **Health Resources** | | | | | | | | |
| Number of R.N. Schools | .04 | .00 | .16* | .01* | .11* | .02* | .10* | .00* |
| Number of FTE R.N.s per 100,000 Population | 306.00 | 205.00 | 206.78* | 132.84* | 142.58* | 104.00* | 199.18* | 157.59* |
| Number of Physician Extenders per 100,000 Population | 8.82 | 9.04 | 4.68 | 5.17 | 3.25 | 2.67 | 7.49 | 5.72 |
| Number of Hospitals | 2.75* | .40* | 2.58* | 1.58* | 2.34* | 1.55* | 2.61* | 1.32* |
| Number of Hospital Beds | 270.18* | 39.60* | 220.28* | 85.03* | 191.37* | 88.69* | 147.95* | 53.22* |
| Number of Hospital Beds per 100,000 Population | 896.49 | 308.36 | 1,106.43* | 927.78* | 796.84 | 733.01 | 943.72 | 920.28 |
| Number of Neonatal ICU Beds per 100,000 Population | 1.53 | 0.00 | .35* | 0.00* | .06 | .04 | .12 | 0.00 |
| Local Per Capita Expenditures for Health | 3.19 | 5.60 | 5.58* | 10.20* | 3.40* | 6.55* | 5.11* | 10.88* |
| Total Number of M.D.s | 33.40* | 2.60* | 15.63* | 4.17* | 15.48* | 5.14* | 16.59* | 3.69* |
| Number of Primary Care M.D.s | 14.75* | 2.40* | 8.62* | 3.06* | 7.78* | 3.34* | 7.87 | 2.18 |
| Total Number of D.O.s | 2.03* | .60* | 1.61* | .98* | .48* | .31* | .51* | .22* |
| Number of Primary Care D.O.s | 1.85* | .60* | 1.33* | .94* | .40* | .26* | .48* | .26* |
| M.D.s-to-100,000 Population | 116.64* | 28.78* | 67.41* | 36.65* | 61.38* | 37.61* | 84.68* | 45.73* |
| Primary Care MDs to 100,000 Population | 51.55 | 25.06 | 67.41* | 36.65* | 61.38* | 37.61* | .48* | .26* |
| D.O.s to 100,000 Population | 6.08 | 7.45 | 7.55 | 8.58 | 2.33* | 3.07* | 3.13 | 4.14 |
| Primary Care D.O.s to 100,000 Population | 5.57 | 7.45 | 6.35* | 8.24* | 1.98 | 2.66 | 2.92 | 3.73 |
| M.D. Interns and Residents | 2.25 | .20 | .30* | .12* | .40* | .11* | .32* | .05* |
| **Environment** | | | | | | | | |
| January Temperature | 22.51 | 22.10 | 21.64 | 22.73 | 41.98* | 43.26* | 27.03* | 24.66* |
| July Temperature | 69.38 | 69.28 | 73.87* | 74.65* | 79.27* | 80.18* | 69.51 | 69.26 |
| January Precipitation | 2.66 | 2.53 | 1.34 | 1.23 | 3.64* | 3.13* | 1.95* | 1.31* |
| July Precipitation | 3.68 | 3.92 | 3.63* | 3.37* | 4.48 | 4.29 | 1.04 | 1.21 |
| Elevation in Feet | 749.00 | 924.00 | 1,175.00* | 1,423.00* | 699.00* | 937.00* | 3,995.00* | 4,504.00* |
| **Health Status** | | | | | | | | |
| Fertility Rate | 6.56 | 7.15 | 7.83* | 8.41* | 7.36* | 7.74* | 8.78 | 9.10 |
| Percent of Births to Teenage Women | 6.39 | 6.72 | 6.27 | 6.46 | 11.28 | 11.38 | 6.14 | 5.64 |
| Infant Mortality Rate | 129.00 | 92.60 | 138.12 | 136.21 | 178.20 | 182.02 | 138.72 | 138.20 |
| Deaths per 100,000 Population | 977.00 | 1,016.00 | 1,050.00* | 1,113.00* | 1,004.00 | 1,029.00 | 806.22 | 858.30 |
| Deaths per 100,000 - from Infective /Parasitic Diseases | 6.39 | 5.89 | 5.48 | 5.10 | 8.73 | 8.21 | 5.98 | 4.09 |
| Deaths per 100,000 - from Influenza /Pneumonia | 22.56 | 16.73 | 30.06 | 29.85 | 25.15 | 25.53 | 21.33 | 19.33 |
| Deaths per 100,000 - from Cardio -Vascular Conditions | 506.00 | 535.00 | 569.60* | 610.52* | 514.80* | 539.39* | 369.00 | 394.80 |

continued--

Table IV.5(a) continued

| Characteristics | North Region | | Central Region | | South Region | | West Region | |
|---|---|---|---|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| **Health Status** | | | | | | | | |
| Incidence of Measles per 100,000 Population | 7.08 | 39.02 | 11.12* | 3.62* | 4.24 | 5.44 | 7.13* | 1.40* |
| Incidence of Mumps per 100,000 Population | 5.31* | 0.00* | 7.46* | 3.65* | 9.65 | 11.96 | 2.15 | 6.47 |
| Incidence of Rubella per 100,000 Population | 5.65 | 4.34 | 7.94 | 5.21 | 2.64 | 1.75 | 7.67 | 4.12 |
| **Health Utilization** | | | | | | | | |
| Inpatient Hospital Visits per 100,000 Population | 122,282.00 | 44,153.00 | 130,946.00* | 92,085.00* | 94,437.00* | 76,521.00* | 101,467.00 | 91,718.00 |
| Outpatient Hospital Visits per 100,000 Population | 128,565.00* | 12,250.00* | 70,076.00* | 49,877.00* | 57,324.00* | 33,881.00* | 95,817.00* | 52,805.00* |
| Emergency Hospital Visits per 100,000 Population | 38,082.00* | 9,141.00* | 23,987.00* | 14,890.00* | 28,034.00* | 18,049.00* | 31,456.00 | 17,574.00 |
| Inpatient Surgical Operations per 100,000 Population | 1,620.00* | 70.00* | 1,145.00* | 257.00* | 977.00* | 287.00* | 803.00* | 137.00* |
| Total Surgical Operations per 100,000 Population | 7,368.00* | 545.00* | 5,405.00* | 2,560.00* | 3,974.00* | 2,384.00* | 4,386.00* | 1,767.00* |
| **Crime** | | | | | | | | |
| Number of Murders per 100,000 Population | 2.53* | 0.00* | 1.90 | 2.22 | 7.51 | 7.37 | 5.43 | 4.91 |
| Number of Rapes per 100,000 Population | 6.07 | 6.86 | 5.42 | 4.71 | 7.53 | 6.49 | 11.00 | 8.31 |
| Number of Burglaries per 100,000 Population | 846.00 | 1,412.00 | 641.39* | 426.04* | 452.10* | 345.70* | 804.00 | 683.70 |

*Difference is significant at the $p < .05$ level, using a one-tailed t-test.







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TABLE IV.5(b)

MEAN CHARACTERISTICS OF COUNTIES WHICH DID AND DID NOT GAIN PHYSICIANS WITH NHSC EXPERIENCE, BY REGION

| Characteristics | North Region | | Central Region | | South Region | | West Region | |
|---|---|---|---|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| Number of Counties | 22.00 | 38.00 | 80.00 | 715.00 | 135.00 | 833.00 | 65.00 | 224.00 |
| **Population** | | | | | | | | |
| Population | 35,544.82* | 26,710.05* | 19,791.41* | 16,035.10* | 21,002.81* | 17,918.44* | 20,064.23* | 11,298.28* |
| Population Growth Rate | 9.60* | 17.77* | 11.97* | 5.36* | 17.58 | 15.81 | 27.50 | 28.09 |
| Percent White | 98.81 | 98.98 | 96.07 | 97.06 | 76.25* | 80.39* | 87.93* | 94.33* |
| Percent Black | .44 | .51 | 1.06 | .64 | 20.90* | 17.67* | .49* | .25* |
| Percent Spanish | .41 | .32 | .38* | .77* | 4.36 | 5.33 | 11.63 | 7.97 |
| Median School Years | 12.00 | 12.00 | 11.90 | 11.87 | 10.57 | 10.75 | 12.09 | 12.10 |
| Population Per Square Mile | 43.77 | 48.87 | 32.02* | 26.76* | 38.46* | 33.83* | 11.50 | 8.14 |
| **Cultural** | | | | | | | | |
| Number Colleges and Universities | .50 | .37 | .18 | .13 | .14 | .09 | .17* | .09* |
| Per Capita Educational Expenditures | 364.89 | 326.72 | 337.75 | 349.58 | 280.50 | 271.73 | 407.57 | 400.64 |
| Number of Urban Contiguous Counties | 1.05 | 1.24 | .89 | .68 | .92 | .88 | .82* | .54* |
| **Economic** | | | | | | | | |
| Per Capita Income | 5,344.27 | 5,442.97 | 5,405.54* | 5,842.41* | 4,599.70* | 4,904.55* | 5,728.38 | 5,833.68 |
| Household Income | 12,223.64 | 12,201.89 | 11,189.53* | 12,319.69* | 9,847.70* | 10,167.83* | 11,787.29 | 12,163.85 |
| Growth Rate of Per Capita Income | 58.20 | 60.38 | 55.40* | 50.80* | 62.94* | 66.20* | 59.87 | 65.08 |
| Unemployment Rate | 11.58 | 10.92 | 11.71* | 8.95* | 12.16* | 10.71* | 12.21* | 10.40* |
| Labor Force Participation Rate | 44.95 | 46.07 | 44.60* | 46.91* | 42.86* | 44.40* | 48.61 | 50.37 |
| Percent Labor Force Construction | 5.67* | 7.00* | 6.52 | 6.25 | 7.99 | 8.20 | 8.43 | 8.48 |
| Percent Labor Force White Collar | 40.26 | 41.07 | 38.34* | 37.02* | 36.01 | 36.23 | 44.56* | 40.46* |
| Percent Labor Force Manufacturing | 29.30 | 27.19 | 19.95* | 16.66* | 25.50 | 24.35 | 8.87 | 8.54 |
| Percent Working In State /County of Residence | 79.65 | 74.71 | 76.95* | 81.48* | 71.10 | 73.13 | 88.83 | 86.94 |
| Percent Working In State /Not County of Residence | 16.90 | 21.06 | 20.36* | 16.04* | 25.12 | 23.89 | 8.87 | 10.54 |
| Percent Not Working in State of Residence | 3.46 | 4.23 | 2.70 | 2.34 | 3.78 | 2.97 | 2.29 | 2.52 |
| Percent Agricultural | 4.21 | 4.04 | 1.42* | 2.00* | 6.68* | 8.39* | 6.98* | 10.91* |
| Per Capita Farmer Income | 4,851.83 | 5,274.08 | 2,954.06* | 3,923.46* | 10,082.08 | 5,914.80 | 9,930.37 | 11,071.54 |
| Number of Farms | 508.32 | 395.66 | 863.65 | 849.92 | 602.90 | 592.20 | 317.77* | 343.04* |
| Farmland as Percent of Total Land | 2.42 | 2.52 | 6.12* | 8.02* | 4.55* | 5.37* | 4.65 | 4.76 |
| Occupied Housing Units Per Capita | .35 | .36 | .36* | .36* | .34* | .34* | .35 | .36 |
| Percent of Households Below Poverty Line | 9.99 | 9.39 | 11.65 | 11.24 | 18.46* | 17.22* | 11.71 | 11.00 |
| Percent Persons Below Poverty Line | 13.26 | 12.55 | 14.81 | 14.28 | 22.55 | 21.30 | 14.86 | 14.06 |
| Percent Households Lacking Complete Plumbing | 3.78 | 4.04 | 3.84* | 2.99* | 7.36* | 7.31* | 3.02 | 2.72 |
| Percent Population Receiving AFDC | 3.49 | 3.51 | 2.38* | 3.56* | 4.92* | 3.88* | 3.64* | 2.15* |

continued--

Table IV-B) Continued

| Characteristics | North Region | | Central Region | | South Region | | West Region | |
|---|---|---|---|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| **Health Resources** | | | | | | | | |
| Number of R.N. Schools | .00 | .05 | .06 | .09 | .11 | .67 | .15* | .03* |
| Number of FTE R.N.s per 100,000 Population | 323.81 | 281.72 | 154.01 | 175.55 | 134.26 | 124.71 | 218.93* | 172.28* |
| Number of Physician Extenders per 100,000 Population | 8.77 | 8.87 | 1.08* | .60* | 4.95* | 2.69* | 9.95* | 5.88* |
| Number of Hospitals | 3.00 | 2.29 | 2.05 | 2.14 | 1.89 | 2.02 | 2.97* | 1.85* |
| Number of Hospital Beds | 291.82 | 227.32 | 168.05 | 158.21 | 139.32 | 148.59 | 183.46* | 89.49* |
| Number of Hospital Beds per 100,000 Population | 773.10 | 890.55 | 777.72* | 1,093.89* | 999.62* | 796.11* | 947.05 | 930.83 |
| Number of Neonatal ICU Beds per 100,000 Population | 0.00 | 2.21 | 0.00* | .22* | 0.00 | .06 | .19 | .05 |
| Local Per Capita Expenditures for Health | 2.39* | 3.87* | 4.61* | 8.01* | 3.54* | 4.95* | 4.53* | 8.21* |
| Total Number of M.D.s | 31.05 | 30.71 | 10.23 | 10.48 | 11.80 | 10.93 | 21.12* | 8.71* |
| Number of Primary Care M.D.s | 13.68 | 13.74 | 6.14 | 6.11 | 6.13 | 5.83 | 9.40* | 4.53* |
| Total Number of D.O.s | 2.32 | 1.68 | 1.81 | 1.27 | .53 | .39 | 3.35 | 3.58 |
| Number of Primary Care D.O.s | 2.14 | 1.53 | 1.51 | 1.11 | .43 | .31 | .58* | .34* |
| M.D.s-to-100,000 Population | 82.56 | 124.81 | 47.13* | 54.26* | 49.88 | 51.40 | 91.64* | 62.84* |
| Primary Care MDs to 100,000 Population | 39.17 | 55.23 | 26.94* | 35.59* | 27.09* | 30.96* | 42.53 | 38.39 |
| D.O.s to 100,000 Population | 5.58 | 6.55 | 9.20 | 7.88 | 2.94 | 2.60 | 5.58 | 6.55 |
| Primary Care D.O.s to 100,000 Population | 5.20 | 6.04 | 7.22 | 7.20 | 5.20 | 6.04 | 2.93 | 3.33 |
| M.D. Interns and Residents | .99 | 2.95 | .23 | .22 | .39 | .26 | .38* | .16* |
| **Environment** | | | | | | | | |
| January Temperature | 21.22 | 23.19 | 22.35 | 22.11 | 41.03* | 42.77* | 27.65 | 25.64 |
| July Temperature | 68.84 | 69.68 | 73.28* | 74.32* | 78.66* | 79.82* | 71.00* | 68.95* |
| January Precipitation | 2.53 | 2.72 | 1.64* | 1.29* | 3.52 | 3.41 | 1.59 | 1.73 |
| July Precipitation | 3.73 | 3.69 | 3.67* | 3.50* | 4.63* | 4.36* | 1.10 | 1.11 |
| Elevation in Feet | 876.36 | 698.61 | 977.73* | 1,321.48* | 738.01 | 811.33 | 3,735.69* | 4,330.82* |
| **Health Status** | | | | | | | | |
| Fertility Rate | 7.00* | 6.00* | 8.00 | 8.20 | 7.10 | 8.10 | 9.00 | 9.20 |
| Percent of Births to Teenage Women | 5.94 | 6.70 | 7.02* | 6.28* | 11.52 | 11.29 | 6.78* | 5.70* |
| Infant Mortality Rate | 126.59 | 125.61 | 147.51* | 136.11* | 180.16 | 179.79 | 154.68* | 133.83* |
| Deaths per 100,000 Population | 976.94 | 982.18 | 1,081.69 | 1,078.09 | 976.12* | 1,021.22* | 821.02 | 828.44 |
| Deaths per 100,000 - from Infective /Parasitic Diseases | 6.53 | 6.25 | 7.47* | 5.07* | 8.75 | 8.47 | 7.07* | 4.70* |
| Deaths per 100,000 - from Influenza /Pneumonia | 24.04 | 20.94 | 28.73 | 30.10 | 25.00 | 25.69 | 22.31 | 20.23 |
| Deaths per 100,000 - from Cardio -Vascular Conditions | 500.31 | 516.40 | 570.40 | 590.02 | 497.93* | 527.79* | 366.47 | 382.81 |
| Incidence of Measles per 100,000 Population | 4.96 | 12.51 | 7.52 | 7.59 | 2.02* | 5.20* | 3.18 | 5.36 |
| Incidence of Mumps per 100,000 Population | 8.36 | 2.84 | 6.55 | 5.65 | 5.10* | 11.54* | 2.96 | 4.11 |
| Incidence of Rubella per 100,000 Population | 8.67 | 3.73 | 11.05 | 6.22 | 1.36 | 2.40 | 8.30 | 5.68 |

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Table IV.5(b) continued

| Characteristics | North Region | | Central Region | | South Region | | West Region | |
|---|---|---|---|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| **Health Utilization** | | | | | | | | |
| Inpatient Hospital Visits per 100,000 Population | 105,494.23 | 121,729.37 | 91,246.18* | 115,909.44* | 71,048.15* | 90,599.22* | 104,424.90 | 95,647.49 |
| Outpatient Hospital Visits per 100,000 Population | 79,366.61 | 141,744.80 | 83,032.05 | 55,412.16 | 49,270.27 | 46,949.69 | 101,565.53* | 72,258.86* |
| Emergency Hospital Visits per 100,000 Population | 26,368.75* | 40,528.47* | 22,632.08 | 19,578.18 | 23,183.16 | 23,846.03 | 35,173.63* | 23,312.35* |
| Inpatient Surgical Operations per 100,000 Population | 1,635.00 | 1,406.76 | 617.29 | 758.21 | 671.64 | 682.73 | 1,024.85* | 400.54* |
| Total Surgical Operations per 100,000 Population | 4,934.34 | 7,879.60 | 3,154.55* | 4,230.45* | 2,975.38 | 3,343.76 | 4,779.38* | 2,938.95* |
| **Crime** | | | | | | | | |
| Number of Murders per 100,000 Population | 3.56 | 1.61 | 1.72 | 2.08 | 8.44 | 7.29 | 5.46 | 5.15 |
| Number of Rapes per 100,000 Population | 6.69 | 5.81 | 4.78 | 5.13 | 7.62 | 7.00 | 12.57 | 9.17 |
| Number of Burglaries per 100,000 Population | 935.32 | 868.85 | 801.78* | 515.32* | 458.90 | 397.95 | 787.21 | 747.65 |

*Difference is significant at the $p < .05$ level, using a two-tailed t-test.

TABLE IV.5(c)

MEAN CHARACTERISTICS OF COUNTIES WHICH DID AND AND DID NOT GAIN
YOUNG M.D.S WITH NO NHSC EXPERIENCE, BY REGION

| Characteristics | North Region | | Central Region | | South Region | | West Region | |
|---|---|---|---|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| Number of Counties | 51.00 | 9.00 | 407.00 | 388.00 | 499.00 | 469.00 | 164.00 | 125.00 |
| **Population** | | | | | | | | |
| Population | 32,740.00* | 14,135.00* | 21,834.00* | 10,713.00* | 23,858.00* | 12,487.00* | 18,279.00* | 6,626.00* |
| Population Growth Rate | 14.59 | 15.86 | 7.12* | 4.86* | 17.37* | 14.68* | 30.88 | 24.12 |
| Percent White | 98.85* | 99.32* | 97.58 | 96.31 | 80.11 | 79.49 | 91.26* | 95.05* |
| Percent Black | .53* | .22* | .71 | .66 | 17.89 | 17.31 | .37 | .21 |
| Percent Spanish | .48 | .49 | .75 | .75 | 3.32* | 7.19* | 9.49 | 7.88 |
| Median School Years | 12.00 | 12.00 | 11.96* | 11.79* | 10.83* | 10.61* | 12.16* | 12.02 |
| Population Per Square Mile | 50.75* | 25.78* | 35.04 | 19.15 | 43.05* | 25.32* | 11.67* | 5.12* |
| **Cultural** | | | | | | | | |
| Number Colleges and Universities | .47 | .11 | .24* | .05* | .15* | .05* | .13* | .01* |
| Per Capita Educational Expenditures | 341.35 | 337.14 | 344.54 | 352.41 | 255.93* | 291.06* | 385.70* | 424.10* |
| Number of Urban Contiguous Counties | 1.20 | 1.00 | .79* | .60* | .94 | .83 | .68* | .49* |
| **Economic** | | | | | | | | |
| Per Capita Income | 5,446.00 | 5,183.00 | 6,034.00* | 5,550.00* | 4,846.00 | 4,879.00 | 5,923.00 | 5,662.00 |
| Household Income | 12,257.00 | 11,944.00 | 12,557.00* | 11,838.00* | 10,257.00* | 9,980.00* | 12,173.00 | 11,956.00 |
| Growth Rate of Per Capita Income | 59.82 | 58.22 | 53.03* | 49.37* | 64.85 | 66.68 | 63.87 | 63.95 |
| Unemployment Rate | 10.61 | 14.33 | 9.54 | 8.88 | 11.40* | 10.36* | 11.68* | 9.64* |
| Labor Force Participation Rate | 45.77 | 45.05 | 47.65* | 45.65* | 44.10 | 44.30 | 50.18 | 49.71 |
| Percent Labor Force Construction | 6.40 | 7.16 | 6.15 | 6.41 | 8.13 | 8.21 | 8.51 | 8.41 |
| Percent Labor Force White Collar | 41.10 | 39.00 | 39.68* | 34.35* | 37.60* | 34.70* | 44.22* | 37.66* |
| Percent Labor Force Manufacturing | 27.95 | 28.04 | 18.99* | 14.90* | 25.81* | 23.13* | 9.39* | 7.60* |
| Percent Working in State /County of Residence | 78.58* | 64.89* | 83.03* | 78.91* | 75.82* | 69.70* | 88.22 | 86.25 |
| Percent Working in State /Not County of Residence | 18.42 | 25.81 | 14.72* | 18.33* | 21.16* | 27.15* | 9.16 | 11.48 |
| Percent Not Working in State of Residence | 3.00 | 9.29 | 2.25 | 2.51 | 3.01 | 3.16 | 2.62 | 2.27 |
| Percent Agricultural | 4.06 | 4.34 | 15.77* | 23.26* | 6.70* | 9.70* | 6.70* | 14.40* |
| Per Capita Farmer Income | 4,998.00 | 5,808.00 | 4,097.00 | 3,541.00 | 5,221.00* | 7,833.00* | 11,771.00 | 9,548.00 |
| Number of Farms | 470.00 | 248.00 | 970.00* | 726.00* | 696.00 | 485.00 | 434.00* | 314.00* |
| Farmland as Percent of Total Land | 2.55 | 2.05 | 7.69 | 8.00 | 4.88* | 5.66* | 4.30* | 5.30* |
| Occupied Housing Units Per Capita | .35 | .36 | .36 | .36 | .35 | .34 | .35 | .36 |
| Percent of Households Below Poverty Line | 9.62 | 9.54 | 9.76* | 12.90* | 16.68* | 18.16* | 10.42* | 12.11* |
| Percent Persons Below Poverty Line | 12.84 | 12.67 | 12.69* | 16.06* | 20.71* | 22.30* | 13.64* | 15.02* |
| Percent Households Lacking Complete Plumbing | 4.60 | 3.60 | 2.71* | 3.46* | 7.37 | 7.90 | 2.80 | 2.80 |
| Percent Population Receiving AFDC | 3.60 | 3.00 | 2.52 | 2.49 | 3.98 | 4.07 | 2.90* | 1.93* |

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Table IV.5(c) continued

| Characteristics | North Region | | Central Region | | South Region | | West Region | |
|---|---|---|---|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| **Health Resources** | | | | | | | | |
| Number of R.N. Schools | .04 | 0.00 | .17* | .01* | .11* | .03* | .10* | 0.00* |
| Number of FTE R.N.s per 100,000 Population | 316.90* | 189.19* | 214.20* | 130.60* | 146.24* | 104.54* | 196.70* | 164.52* |
| Number of Physician Extenders per 100,000 Population | 9.27 | 6.35 | 4.70 | 5.11 | 3.19 | 2.80 | 7.09 | 6.41 |
| Number of Hospitals | 2.88* | .67* | 2.69* | 1.59* | 2.43* | 1.54* | 2.66* | 1.36* |
| Number of Hospital Beds | 280.86* | 81.56* | 231.32* | 83.55* | 202.95* | 88.21* | 152.00* | 56.20* |
| Number of Hospital Beds per 100,000 Population | 929.59* | 382.19* | 1,152.86* | 892.34* | 829.70* | 704.32* | 940.52 | 927.00 |
| Number of Neonatal ICU Beds per 100,000 Population | 1.65 | 0.00 | .38* | 0.00* | .07 | .03 | .14 | 0.00 |
| Local Per Capita Expenditures for Health | 3.06 | 5.22 | 5.57* | 9.87* | 3.28* | 6.32* | 4.80* | 10.80* |
| Total Number of M.D.s | 35.47* | 4.56* | 16.40* | 4.21* | 16.47* | 5.28* | 17.44* | 3.71* |
| Number of Primary Care M.D.s | 15.51* | 3.56* | 9.00* | 3.09* | 8.20* | 3.40* | 8.26* | 2.18* |
| Total Number of D.O.s | 1.82 | 2.44 | 1.60* | 1.03* | .46 | .35 | .52* | .23* |
| Number of Primary Care D.O.s | 1.73 | 1.89 | 1.33* | .97* | .39 | .28 | .49* | .27* |
| M.D.s-to-100,000 Population | 123.32* | 29.98* | 70.01* | 36.22* | 63.94* | 37.62* | 87.18* | 45.88* |
| Primary Care MDs to 100,000 Population | 53.00* | 28.42* | 41.89* | 27.59* | 34.28* | 26.32* | 44.47* | 32.56* |
| D.O.s to 100,000 Population | 5.70 | 9.00 | 7.12 | 8.95 | 2.12 | 3.20 | 3.00 | 4.22 |
| Primary Care D.O.s to 100,000 Population | 5.38 | 7.73 | 6.15* | 8.30* | 1.87 | 2.70 | 2.86 | 3.75 |
| M.D. Interns and Residents | 2.41 | .22 | .31* | .12* | .42 | .12 | .32* | .07* |
| **Environment** | | | | | | | | |
| January Temperature | 22.62 | 21.61 | 21.50* | 22.80* | 42.07* | 43.01* | 27.03* | 24.86* |
| July Temperature | 69.41 | 69.12 | 73.85* | 74.60* | 79.30* | 80.04* | 69.22 | 69.66 |
| January Precipitation | 2.65 | 2.64 | 1.32 | 1.25 | 3.67* | 3.16* | 2.04* | 1.25* |
| July Precipitation | 3.66 | 3.95 | 3.63* | 3.39* | 4.48 | 4.32 | 1.01* | 1.22* |
| Elevation in Feet | 729.00 | 962.00 | 1,183.00* | 1,396.00* | 687.00* | 923.00* | 3,993.00 | 4,462.00 |
| **Health Status** | | | | | | | | |
| Fertility Rate | 6.95 | 6.94 | 7.82* | 8.38* | 7.61 | 7.75 | 8.76 | 9.10 |
| Percent of Births to Teenage Women | 6.51 | 5.92 | 6.16* | 6.56* | 11.27 | 11.38 | 6.16 | 5.67 |
| Infant Mortality Rate | 129.05 | 108.44 | 136.55 | 138.00 | 178.47 | 181.29 | 138.00 | 138.00 |
| Deaths per 100,000 Population | 981.00 | 976.00 | 1,043.00* | 1,115.00* | 1,006.00 | 1,024.00 | 804.00 | 856.00 |
| Deaths per 100,000 - from Infective /Parasitic Diseases | 6.37 | 6.23 | 5.21 | 5.42 | 8.90 | 8.10 | 6.06 | 4.14 |
| Deaths per 100,000 - from Influenza /Pneumonia | 22.46 | 19.88 | 30.23 | 29.68 | 25.30 | 25.36 | 21.05 | 20.24 |
| Deaths per 100,000 - from Cardio -Vascular Conditions | 513.00 | 497.00 | 567.00* | 610.00* | 516.00 | 532.00 | 369.00 | 393.00 |
| Incidence of Measles per 100,000 Population | 7.59 | 21.93 | 11.47* | 3.82* | 4.37 | 5.16 | 7.35* | 1.62* |

continued--

Table IV.5(c) continued

| Characteristics | North Region | | Central Region | | South Region | | West Region | |
|---|---|---|---|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| **Health Status** | | | | | | | | |
| Incidence of Mumps per 100,000 Population | 5.85 | .44 | 7.37 | 4.02 | 10.12 | 11.20 | 2.03 | 6.25 |
| Incidence of Rubella per 100,000 Population | 6.09 | 2.41 | 8.16 | 5.18 | 2.72 | 1.77 | 8.15 | 3.81 |
| **Health Utilization** | | | | | | | | |
| Inpatient Hospital Visits per 100,000 Population | 125,910.00 | 58,351.00 | 136,443.00* | 89,215.00* | 101,166.00* | 73,793.00* | 101,043.00 | 93,132.00 |
| Outpatient Hospital Visits per 100,000 Population | 135,927.00* | 22,233.00* | 70,667.00* | 45,118.00* | 60,176.00* | 33,546.00* | 97,442.00* | 54,458.00* |
| Emergency Hospital Visits per 100,000 Population | 40,239.00* | 7,555.00* | 24,606.00* | 14,922.00* | 29,291.00* | 17,861.00* | 32,139.00* | 17,900.00* |
| Inpatient Surgical Operations per 100,000 Population | 1,716.00* | 213.00* | 12,111.00* | 254.00* | 1,051.00 | 288.00 | 851.00* | 134.00* |
| Total Surgical Operations per 100,000 Population | 7,847.00* | 867.00* | 5,652.00* | 2,513.00* | 4,164.00* | 2,365.00* | 4,577.00* | 1,747.00* |
| **Crime** | | | | | | | | |
| Number of Murders per 100,000 Population | 1.96 | 4.38 | 2.00 | 2.09 | 7.71 | 7.16 | 5.47 | 4.90 |
| Number of Rapes per 100,000 Population | 5.94 | 7.24 | 5.89 | 4.59 | 7.64 | 6.49 | 11.11 | 8.40 |
| Number of Burglaries per 100,000 Population | 798.00 | 1433.00 | 625.00* | 458.00* | 459.49* | 350.00* | 821.00* | 672.00* |

*Difference is significant at the $p < .05$ level, using a two-tailed t-test



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TABLE IV.5(d)

MEAN CHARACTERISTICS OF HMSA COUNTIES WHICH DID AND DID NOT GAIN FPOs, BY REGION

| Characteristics | North Region | | Central Region | | South Region | | West Region | |
|---|---|---|---|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| Number of Counties | 21 | 31 | 89 | 328 | 142 | 434 | 63 | 126 |
| **Population** | | | | | | | | |
| Population | 35,445.29* | 26,182.16* | 18,221.55* | 13,746.26* | 20,461.04* | 16,400.70* | 14,356.00 | 12,302.54 |
| Population Growth Rate | 12.71 | 16.48 | 12.04* | 5.17* | 18.15* | 14.12* | 30.96 | 27.78 |
| Percent White | 99.09 | 98.95 | 98.05* | 95.62* | 77.98 | 77.80 | 90.52 | 92.77 |
| Percent Black | .38 | .52 | .82 | .54 | 20.32 | 19.95 | .47 | .26 |
| Percent Spanish | .43 | .55 | .52 | .56 | 2.38* | 5.17* | 10.56 | 9.81 |
| Median School Years | 12.00 | 12.00 | 11.81 | 11.81 | 10.63 | 10.51 | 12.05 | 12.02 |
| Population Per Square Mile | 38.52 | 49.23 | 28.54* | 23.11* | 37.58* | 29.81* | 7.56 | 7.37 |
| **Cultural** | | | | | | | | |
| Number Colleges and Universities | .52 | .42 | .08 | .09 | .11 | .07 | .06 | .06 |
| Per Capita Educational Expenditures | 355.94 | 345.34 | 336.55 | 351.75 | 275.27 | 277.51 | 416.11 | 409.34 |
| Number of Urban Contiguous Counties | 1.14 | 1.39 | .73 | .69 | 1.07* | .82* | .56 | .70 |
| **Economic** | | | | | | | | |
| Per Capita Income | 5,184.57 | 5,396.61 | 5,366.15 | 5,486.75 | 4,631.44 | 4,592.21 | 5,835.02 | 5,645.83 |
| Household Income | 11,842.67 | 12,179.65 | 11,266.36* | 11,973.16* | 9,976.94 | 9,760.57 | 11,886.25 | 11,797.48 |
| Growth Rate of Per Capita Income | 59.77 | 57.91 | 56.38* | 50.11* | 62.73 | 63.27 | 67.17 | 62.84 |
| Unemployment Rate | 12.03 | 10.52 | 11.37* | 9.45* | 12.49 | 11.65 | 11.59 | 10.55 |
| Labor Force Participation Rate | 43.51* | 46.41* | 45.13 | 45.52 | 42.51 | 42.65 | 50.79 | 47.87 |
| Percent Labor Force Construction | 5.90* | 7.09* | 6.56 | 6.23 | 8.25 | 8.05 | 8.39 | 8.71 |
| Percent Labor Force White Collar | 39.56 | 40.90 | 36.54 | 35.28 | 36.17* | 34.66* | 41.41 | 40.67 |
| Percent Labor Force Manufacturing | 28.45 | 26.97 | 20.45* | 15.65* | 24.70 | 25.92 | 8.38 | 8.45 |
| Percent Working In State /County of Residence | 80.38* | 72.55* | 77.19 | 79.17 | 70.99 | 68.99 | 88.33 | 86.36 |
| Percent Working In State /Not County of Residence | 16.30* | 22.86* | 20.09 | 17.64 | 24.41* | 27.72* | 8.82* | 11.61* |
| Percent Not Working In State of Residence | 3.32 | 4.60 | 2.74 | 2.89 | 4.60* | 3.29* | 2.84 | 2.04 |
| Percent Agricultural | 3.58 | 4.82 | 16.85* | 22.37* | 7.12* | 8.55* | 8.56* | 11.13* |
| Per Capita Farmer Income | 4,506.72 | 5,198.66 | 4,438.56 | 3,498.27 | 5,232.01 | 7,294.37 | 14,106.78 | 9,594.94 |
| Number of Farms | 511.62 | 420.00 | 876.69 | 785.71 | 603.65 | 547.85 | 420.49 | 372.08 |
| Farmland as Percent of Total Land | 2.13 | 2.98 | 6.16* | 7.69* | 4.54 | 4.95 | 4.87 | 4.84 |
| Occupied Housing Units Per Capita | .35 | .35 | .36 | .36 | .34 | .34 | .35 | .36 |
| Percent of Households Below Poverty Line | 10.59 | 9.48 | 11.17* | 13.03* | 17.76 | 19.02 | 11.69 | 12.07 |
| Percent Persons Below Poverty Line | 13.99 | 12.70 | 14.15* | 16.27* | 21.93 | 23.20 | 14.53 | 15.23 |
| Percent Households Lacking Complete Plumbing | 4.90 | 3.67 | 3.59 | 3.74 | 9.44 | 8.83 | 2.69 | 3.18 |
| Percent Population Receiving AFDC | 4.25* | 3.13* | 3.17 | 2.77 | 4.70 | 4.65 | 3.06 | 2.60 |

continued—

Table IV.5(d) continued

| Characteristics | North Region | | Central Region | | South Region | | West Region | |
|---|---|---|---|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| **Health Resources** | | | | | | | | |
| Number of R.N. Schools | .00 | .06 | .03 | .05 | .08 | .05 | .06 | .06 |
| Number of FTE R.N.s per 100,000 Population | 284.13 | 273.64 | 140.65 | 148.76 | 120.21 | 107.01 | 185.78 | 173.64 |
| Number of Physician Extenders per 100,000 Population | 9.17 | 9.27 | 5.91 | 5.22 | 3.36 | 3.17 | 11.81* | 5.56* |
| Number of Hospitals | 3.05 | 2.19 | 2.12* | 1.70* | 1.92* | 1.64* | 2.51* | 1.84* |
| Number of Hospital Beds | 260.10 | 229.10 | 145.38 | 119.77 | 138.00* | 110.29* | 121.16 | 98.94 |
| Number of Hospital Beds per 100,000 Population | 768.19 | 861.23 | 840.97 | 865.06 | 679.57 | 581.22 | 1,036.96 | 852.02 |
| Number of Neonatal ICU Beds per 100,000 Population | .00 | 2.71 | .00 | .11 | .00 | .08 | .20 | .00 |
| Local Per Capita Expenditures for Health | 2.14* | 4.13* | 5.73* | 8.25* | 3.66* | 4.56* | 6.41 | 8.67 |
| Total Number of M.D.s | 29.24 | 30.84 | 8.26 | 7.47 | 9.85* | 8.00* | 11.46 | 10.25 |
| Number of Primary Care M.D.s | 14.24 | 13.13 | 5.44 | 4.57 | 5.63* | 4.44* | 5.46 | 4.93 |
| Total Number of D.O.s | 2.86 | 1.42 | 1.29* | .83* | .36 | .30 | .44 | .37 |
| Number of Primary Care D.O.s | 2.57 | 1.35 | 1.17* | .74* | .23 | .27 | .35 | .43 |
| M.D.s-to-100,000 Population | 85.40 | 125.33 | 41.26 | 41.61 | 44.74 | 40.23 | 66.24 | 58.18 |
| Primary Care MDs to 100,000 Population | 40.38 | 55.53 | 28.26 | 28.72 | 27.02 | 24.76 | 37.26 | 33.00 |
| D.O.s to 100,000 Population | 7.90 | 5.07 | 7.38 | 5.22 | 2.51 | 2.04 | 4.03 | 3.71 |
| Primary Care D.O.s to 100,000 Population | 7.26 | 4.84 | 6.40 | 4.83 | 1.54 | 1.90 | 3.28 | 3.43 |
| M.D. Interns and Residents | .52 | 3.32 | .13 | .24 | .30 | .23 | .35* | .14* |
| **Environment** | | | | | | | | |
| January Temperature | 22.03 | 22.60 | 21.84 | 20.66 | 41.00* | 42.38* | 27.16 | 26.57 |
| July Temperature | 68.58 | 70.05 | 72.80 | 73.69 | 78.64* | 79.49* | 70.91 | 69.63 |
| January Precipitation | 2.66 | 2.61 | 1.53* | 1.25* | 3.61 | 3.63 | 1.97 | 1.79 |
| July Precipitation | 3.73 | 3.64 | 3.59* | 3.43* | 4.72 | 4.58 | 1.18 | 1.07 |
| Elevation in Feet | 765.10 | 738.94 | 1,056.80* | 1,325.46* | 677.82 | 753.48 | 4,094.03 | 4,062.17 |
| **Health Status** | | | | | | | | |
| Fertility Rate | 6.67 | 6.53 | 7.77* | 8.40* | 7.35* | 7.63* | 9.40* | 8.73* |
| Percent of Births to Teenage Women | 7.19* | 6.09* | 6.88* | 6.30* | 11.56 | 11.67 | 6.24 | 6.23 |
| Infant Mortality Rate | 125.76 | 126.29 | 134.13 | 135.02 | 184.84 | 183.04 | 150.02 | 134.51 |
| Deaths per 100,000 Population | 988.84 | 969.48 | 1,068.90 | 1,070.50 | 1,018.51 | 988.11 | 843.96 | 833.15 |
| Deaths per 100,000 - from Infective /Parasitic Diseases | 8.29 | 5.37 | 6.01 | 5.21 | 7.94 | 8.98 | 7.17 | 5.25 |
| Deaths per 100,000 - from Influenza /Pneumonia | 18.94 | 23.25 | 28.64 | 30.35 | 24.76 | 24.10 | 20.31 | 21.00 |
| Deaths per 100,000 - from Cardio -Vascular Conditions | 521.07 | 500.04 | 572.54 | 582.35 | 520.65 | 507.67 | 398.03 | 370.50 |
| Incidence of Measles per 100,000 Population | 3.41 | 15.58 | 10.01 | 7.39 | 2.23 | 4.71 | 2.47 | 4.04 |
| Incidence of Mumps per 100,000 Population | 9.29 | 2.98 | 5.91 | 4.12 | 4.80 | 8.80 | 1.91 | 5.90 |
| Incidence of Rubella per 100,000 Population | 3.65 | 4.13 | 9.60 | 5.42 | 2.13 | 2.14 | 3.06 | 6.00 |

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Table IV.5(d) continued

| Characteristics | North Region | | Central Region | | South Region | | West Region | |
|---|---|---|---|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| **Health Utilization** | | | | | | | | |
| Inpatient Hospital Visits per 100,000 Population | 103,085.02 | 120,034.59 | 94,848.60 | 92,560.85 | 77,186.15 | 65,902.85 | 116,361.53 | 113,737.45 |
| Outpatient Hospital Visits per 100,000 Population | 104,455.22 | 128,276.30 | 99,996.30 | 90,436.05 | 47,026.74 | 37,725.74 | 89,587.35 | 68,284.20 |
| Emergency Hospital Visits per 100,000 Population | 37,922.52 | 32,541.67 | 21,931.79 | 16,073.35[a] | 24,066.07[a] | 18,199.67[a] | 31,614.30[a] | 22,283.54[a] |
| Inpatient Surgical Operations per 100,000 Population | 1501.90 | 1369.19 | 494.53 | 496.53 | 499.48 | 458.93 | 475.76 | 473.95 |
| Total Surgical Operations per 100,000 Population | 5,663.97 | 7,737.75 | 2,858.46 | 2,944.10 | 2,437.44 | 2,302.98 | 2987.17 | 2,800.68 |
| **Crime** | | | | | | | | |
| Number of Murders per 100,000 Population | 1.48 | 3.06 | 2.10 | 2.20 | 8.25 | 7.03 | 7.79 | 5.38 |
| Number of Rapes per 100,000 Population | 7.18 | 5.36 | 5.70 | 4.40 | 7.64 | 6.95 | 14.14 | 9.39 |
| Number of Burglaries per 100,000 Population | 843.17 | 965.90 | 849.32[a] | 515.70[a] | 417.57 | 364.51 | 780.41 | 799.91 |

[a]Difference is significant at the $p < .05$ level, using a two-tailed t-test.

TABLE IV.6(a)

MEAN CHARACTERISTICS OF COUNTIES WHICH DID AND DID NOT GAIN
ALL YOUNG PHYSICIANS, BY COUNTY POPULATION SIZE

| County Characteristics | County Population Under 10,000 | | 10,000 - 24,000 | | 25,000 and Over | |
|---|---|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| Number of Counties | 227.00 | 513.00 | 368.00 | 341.00 | 424.00 | 39.00 |
| **Population** | | | | | | |
| Population | 7,317.00* | 5,543.00* | 17,773.00* | 15,885.00* | 35,608.00 | 33,530.00 |
| Population Growth Rate | 15.99* | 8.34* | 15.68 | 14.97 | 15.31 | 22.97 |
| Percent White | 90.98 | 90.23 | 87.84 | 86.60 | 88.00 | 87.74 |
| Percent Black | 5.14 | 5.74 | 9.23 | 11.09 | 9.78 | 10.82 |
| Percent Spanish | 4.35 | 5.30 | 3.46 | 4.25 | 2.37* | .48* |
| Median School Years | 11.48 | 11.41 | 11.36 | 11.07 | 11.58 | 11.28 |
| Population Per Square Mile | 14.21* | 10.62* | 28.65 | 29.44 | 54.62 | 58.10 |
| **Cultural** | | | | | | |
| Number Colleges and Universities | .05* | .01* | .13* | .06* | .34 | .23 |
| Per Capita Educational Expenditures | 346.88* | 371.03* | 311.88* | 282.51* | 294.32* | 265.15* |
| Number of Urban Contiguous Cenlies | .51 | .45 | .79 | .91* | 1.15* | 1.62* |
| **Economic** | | | | | | |
| Per Capita Income | 5,337.00 | 5,386.00 | 5,398.00* | 5,068.00* | 5,510.00 | 5,398.00 |
| Household Income | 11,097.00 | 11,180.00 | 11,186.00* | 10,728.00* | 11,793.00 | 11,781.00 |
| Growth Rate of Per Capita Income | 57.76 | 60.23 | 60.18 | 57.97 | 61.38 | 62.50 |
| Unemployment Rate | 9.34* | 8.04* | 10.73* | 11.60* | 11.62 | 12.00 |
| Labor Force Participation Rate | 47.00 | 46.67 | 46.30 | 44.40 | 45.63 | 42.84 |
| Percent Labor Force Construction | 8.35* | 7.46* | 7.47 | 7.38 | 6.86* | 6.78* |
| Percent Labor Force White Collar | 37.10* | 34.10* | 38.51* | 35.60* | 41.32 | 40.25 |
| Percent Labor Force Manufacturing | 14.16 | 12.70 | 21.19* | 23.92* | 24.70 | 25.78 |
| Percent Working in State /County of Residence | 78.40 | 78.44 | 79.12* | 72.42* | 81.00* | 70.82* |
| Percent Working in State /Not County of Residence | 18.56 | 18.89 | 18.03* | 24.57* | 16.49* | 25.36* |
| Percent Not Working in State of Residence | 3.05 | 2.47 | 2.85 | 3.00 | 2.53 | 3.81 |
| Percent Agricultural | 13.90* | 19.30* | 10.71* | 12.00* | 6.80 | 6.70 |
| Per Capita Farmer Income | 9,398.00 | 6,266.00 | 5,671.00 | 4,880.00 | 5,268.00 | 6,362.00 |
| Number of Farms | 420.00 | 410.00 | 739.00 | 733.00 | 894.00 | 875.00 |
| Farmland as Percent of Total Land | 5.74* | 7.03* | 5.93 | 6.08 | 5.34 | 5.75 |
| Occupied Housing Units Per Capita | .36 | .36 | .34* | .35* | .35 | .33 |
| Percent of Households Below Poverty Line | 13.96* | 15.34* | 13.75* | 15.25* | 11.95 | 12.85 |
| Percent Persons Below Poverty Line | 17.43* | 18.94* | 17.30* | 18.88* | 15.37 | 16.00 |
| Percent Households Lacking Complete Plumbing | 5.46 | 4.84 | 5.34* | 6.13* | 4.33 | 5.00 |
| Percent Population Receiving AFDC | 3.00 | 2.56 | 3.49 | 3.67 | 3.46 | 3.76 |
| **Health Resources** | | | | | | |
| Number of R.N. Schools | .02 | 0.00 | .07* | .02* | .24* | .08* |
| Number of FTE R.N.s per 100,000 Population | 165.70* | 121.64* | 159.09* | 122.38* | 218.31* | 144.62* |
| Number of Physician Extenders per 100,000 Population | 6.27 | 4.90 | 4.54* | 3.07* | 3.85 | 2.55 |
| Number of Hospitals | 1.51* | 1.29* | 2.37* | 1.82* | 3.16* | 2.56* |
| Number of Hospital Beds | 72.48* | 50.57* | 155.80* | 111.79* | 325.00* | 245.00* |
| Number of Hospital Beds per 100,000 Population | 1,058.00 | 925.70 | 894.48* | 705.00* | 916.84* | 729.80* |
| Number of Neonatal ICU Beds per 100,000 Population | 0.00 | 0.00 | .27 | .04 | .33* | 0.00* |
| Local Per Capita Expenditures for Health | 9.94* | 12.06* | 3.96 | 4.06 | 2.08 | 2.09 |
| Total Number of M.D.s | 4.22* | 2.06* | 11.60 | 6.57 | 29.63* | 19.69* |

continued--

TABLE IV.6(a) continued

| County Characteristics | County Population Under 10,000 Gained | Under 10,000 Failed to Gain | 10,000 - 24,000 Gained | 10,000 - 24,000 Failed to Gain | 25,000 and Over Gained | 25,000 and Over Failed to Gain |
|---|---|---|---|---|---|---|
| **Health Resources** | | | | | | |
| Number of Primary Care M.D.s | 2.70* | 1.59* | 6.72 | 4.52 | 13.72* | 9.92* |
| Total Number of D.O.s | .39 | .34 | .75 | .85 | 1.54 | 1.10 |
| Number of Primary Care D.O.s | .33 | .31 | .68 | .80 | 1.24 | 1.08 |
| M.D.s-to-100,000 Population | 57.76* | 35.12* | 64.36* | 40.67* | 82.32* | 57.32* |
| Primary Care MDs to 100,000 Population | 37.25* | 27.70* | 38.12* | 28.69* | 38.43* | 29.53* |
| D.O.s to 100,000 Population | 4.90 | 5.38 | 4.39 | 5.50 | 4.44 | 3.16 |
| Primary Care D.O.s to 100,000 Population | 4.20 | 5.14 | 3.96* | 5.17* | 3.49 | 3.11 |
| M.D. Interns and Residents | .08 | .05 | 49* | .16* | .61* | .33* |
| **Environment** | | | | | | |
| Jansury Temperature | 29.12 | 30.50 | 31.85* | 35.14* | 32.84 | 35.95 |
| July Temperature | 74.35* | 75.96* | 75.80* | 77.29* | 75.71 | 77.05 |
| January Precipitation | 1.91* | 1.65* | 2.53 | 2.74 | 2.86 | 3.07 |
| July Precipitation | 3.09 | 3.11 | 3.61* | 4.10* | 3.99 | 3.97 |
| Elevation in Feet | 2,172.00 | 2,048.00 | 1,307.00 | 968.00 | 945.00 | 951.00 |
| **Health Status** | | | | | | |
| Fertility Rate | 8.00* | 8.42* | 7.90 | 7.90 | 7.29 | 7.48 |
| Percent of Births to Teenage Women | 7.73 | 7.87 | 8.75* | 9.71* | 8.66 | 9.56 |
| Infant Mortality Rate | 144.72 | 154.11 | 158.60 | 161.84 | 158.52 | 164.35 |
| Deaths per 100,000 Population | 1,030.00 | 1,061.00 | 1,014.00 | 1,022.00 | 940.00 | 928.00 |
| Deaths per 100,000 - from Infective /Parasitic Diseases | 6.81 | 5.67 | 7.46 | 7.45 | 6.68 | 7.37 |
| Deaths per 100,000 - from Influenza /Pneumonia | 29.85 | 27.00 | 529.30 | 540.00 | 23.10 | 20.45 |
| Deaths per 100,000 - from Cardio-Vascular Conditions | 326.00* | 358.00* | 27.14 | 26.44 | 484.40 | 480.21 |
| Incidence of Measles per 100,000 Population | 5.24 | 4.73 | 7.91* | 3.44* | 7.44 | 8.00 |
| Incidence of Mumps per 100,000 Population | 6.23 | 5.22 | 8.72 | 9.80 | 6.81 | 29.36 |
| Incidence of Rubella per 100,000 Population | 7.20 | 2.36 | 3.91 | 3.03 | 6.41* | 1.37* |
| **Health Utilization** | | | | | | |
| Inpatient Hospital Visits per 100,000 Pop. | 114,840.00* | 86,911.00* | 103,772.00* | 80,811.00* | 117,723.00* | 85,733.00* |
| Outpatient Hospital Visits per 100,000 Pop. | 58,043.00* | 39,330.00* | 65,719.00* | 39,476.00* | 83,967.00* | 54,087.00* |
| Emergency Hospital Visits per 100,000 Pop. | 20,355.00* | 14,860.00* | 26,369.00* | 18,192.00* | 32,929.00* | 26,626.00* |
| Inpatient Surgical Operations per 100,000 Pop. | 194.00* | 109.00* | 624.00* | 355.00* | 2,056.00* | 1,300.00* |
| Total Surgical Operations per 100,000 Pop. | 2,999.00* | 2,093.00* | 3,991.00* | 2,508.00* | 6,355.00* | 4,692.00* |
| **Crime** | | | | | | |
| Number of Murders per 100,000 Population | 4.73 | 4.53 | 4.70 | 5.48 | 5.47 | 5.68 |
| Number of Rapes per 100,000 Population | 6.26 | 5.00 | 6.68 | 7.21 | 8.42 | 8.68 |
| Number of Burglaries per 100,000 Population | 615.00* | 382.00* | 539.00 | 487.00 | 639.00* | 499.00* |

*Difference is significant at the $p < .05$ level using a one-tailed t-test.

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TABLE IV.6(b)

MEAN CHARACTERISTICS OF COUNTIES WHICH DID AND DID NOT GAIN YOUNG PHYSICIANS WITH NHSC EXPERIENCE, BY COUNTY POPULATION SIZE

| County Characteristics | County Population Under 10,000 | | 10,000 - 24,000 | | 25,000 and Over | |
|---|---|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| Number of Counties | 58.00 | 682.00 | 145.00 | 764.00 | 99.00 | 364.00 |
| **Population** | | | | | | |
| Population | 7,198.39* | 5,993.45* | 17,471.13 | 16,988.14 | 35,899.21 | 35,306.26 |
| Population Growth Rate | 18.13* | 10.05* | 18.33* | 14.86* | 16.35 | 15.85 |
| Percent White | 87.69 | 90.70 | 87.83 | 85.01 | 85.42 | 88.73 |
| Percent Black | 7.51 | 5.39 | 9.83 | 9.94 | 10.98 | 9.56 |
| Percent Spanish | 5.83 | 4.94 | 5.32 | 3.47 | 2.94 | 2.12 |
| Median School Years | 11.26 | 11.45 | 11.24 | 11.25 | 11.58 | 11.55 |
| Population Per Square Mile | 14.75* | 11.47* | 26.48 | 29.41 | 48.20* | 56.74* |
| **Cultural** | | | | | | |
| Number Colleges and Universities | 0.09* | 0.02* | 0.11 | 0.10 | .33 | .33 |
| Per Capita Educational Expenditures | 334.46 | 366.09 | 332.90* | 294.78* | 320.58* | 284.08* |
| Number of Urban Contiguous Conties | .64 | .45 | .90 | .83 | 1.05 | 1.22 |
| **Economic** | | | | | | |
| Per Capita Income | 4,896.78* | 5,411.63* | 5,090.01* | 5,302.94* | 5,263.22* | 5,586.13* |
| Household Income | 10,044.40* | 11,249.07* | 10,625.14* | 11,088.31* | 11,479.54 | 11,877.52 |
| Growth Rate of Per Capita Income | 59.99 | 59.46 | 60.00 | 59.20 | 59.76 | 61.95 |
| Unemployment Rate | 11.52* | 8.18* | 11.86* | 10.91* | 12.51* | 11.42* |
| Labor Force Participation Rate | 45.19 | 46.89 | 44.70 | 45.76 | 44.45 | 45.66 |
| Percent Labor Force Construction | 8.90* | 7.63* | 7.59 | 7.41 | 6.64 | 7.13 |
| Percent Labor Force White Collar | 35.29 | 36.99 | 38.40* | 37.24* | 41.35 | 41.15 |
| Percent Labor Force Manufacturing | 18.98* | 12.65* | 20.57 | 22.32 | 21.99* | 25.36* |
| Percent Working in State /County of Residence | 71.68* | 79.00* | 77.07 | 76.52 | 80.28 | 80.10 |
| Percent Working in State /Not County of Residence | 24.30* | 18.32* | 19.70 | 20.63 | 17.21 | 17.24 |
| Percent Not Working in State of Residence | 4.01* | 2.53* | 3.24 | 2.85 | 2.51 | 2.68 |
| Percent Agricultural | 10.72* | 18.37* | 9.69* | 11.48* | 5.06* | 7.09* |
| Per Capita Farmer Income | 15,076.34 | 6,626.07 | 6,894.10 | 5,123.82 | 5,098.87 | 5,429.20 |
| Number of Farms | 366.69 | 416.91 | 676.49* | 747.92* | 767.30* | 926.60* |
| Farmland as Percent of Total Land | 4.52* | 6.81* | 5.41* | 6.10* | 4.17* | 5.71* |
| Occupied Housing Units Per Capita | .35* | .36* | .35 | .35 | .34 | .35 |
| Percent of Households Below Poverty Line | 15.17 | 14.89 | 15.31 | 14.12 | 13.18* | 11.71* |
| Percent Persons Below Poverty Line | 18.38 | 18.48 | 19.00 | 17.68 | 16.83* | 15.03* |
| Percent Households Lacking Complete Plumbing | 6.47* | 4.91* | 6.38 | 5.50 | 4.08* | 5.50* |
| Percent Population Receiving AFDC | 3.80 | 2.59 | 4.28* | 3.40* | 4.25* | 3.27* |
| **Health Resources** | | | | | | |
| Number of R.N. Schools | 0.03 | 0.00 | .05 | .06 | .21 | .23 |
| Number of FTE R.N.s per 100,000 Population | 144.40 | 134.37 | 143.64 | 145.71 | 228.27 | 207.70 |
| Number of Physician Extenders per 100,000 Population | 8.87* | 5.01* | 5.57* | 3.69* | 6.23* | 3.06* |
| Number of Hospitals | .95* | 1.37* | 2.19 | 2.17 | 3.14 | 3.10 |
| Number of Hospital Beds | 36.95* | 59.02* | 130.96 | 140.86 | 299.24 | 323.36 |
| Number of Hospital Beds per 100,000 Population | 474.63* | 1008.36* | 764.83 | 834.52 | 843.93 | 916.43 |
| Number of Neonatal ICU Beds per 100,000 Population | 0.00 | 0.00 | 0.00 | .22 | .13 | .35 |
| Local Per Capita Expenditures for Health | 7.84* | 11.71* | 3.72* | 4.05* | 2.04 | 2.09 |
| Total Number of M.D.s | 2.95 | 2.70 | 9.68 | 9.72 | 29.21 | 28.68 |
| Number of Primary Care M.D.s | 1.76 | 1.95 | 5.34 | 5.96 | 13.38 | 13.41 |
| Total Number of D.O.s | .43 | .35 | .81 | .78 | 1.67 | 1.46 |

continued--



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TABLE IV.6(b) continued

| County Characteristics | County Population Under 10,000 Gained | Under 10,000 Failed to Gain | 10,000 - 24,000 Gained | 10,000 - 24,000 Failed to Gain | 25,000 and Over Gained | 25,000 and Over Failed to Gain |
|---|---|---|---|---|---|---|
| **Health Resources** | | | | | | |
| Number of Primary Care D.O.s | .26 | .32 | .74 | .73 | 1.46 | 1.16 |
| M.D.s-to-100,000 Population | 42.65 | 42.02 | 54.28 | 55.70 | 80.13 | 80.23 |
| Primary Care MDs to 100,000 Population | 23.60* | 31.23* | 31.40* | 35.17* | 37.14 | 37.82 |
| D.O.s to 100,000 Population | 5.59 | 5.35 | 4.86 | 4.76 | 4.49 | 4.29 |
| Primary Care D.O.s to 100,000 Population | 3.39 | 4.98 | 4.35 | 4.42 | 3.97 | 3.32 |
| M.D. Interns and Residents | .10 | .06 | .25 | .36 | .67 | .57 |
| **Environment** | | | | | | |
| January Temperature | 32.08 | 29.91 | 32.17 | 33.26 | 30.96* | 33.69* |
| July Temperature | 74.99 | 75.31 | 75.29* | 76.54* | 74.24* | 76.26* |
| January Precipitation | 2.33* | 1.69* | 2.49 | 2.63 | 2.72 | 2.93 |
| July Precipitation | 3.48 | 3.08 | 3.49* | 3.85* | 3.68* | 4.08* |
| Elevation in Feet | 2,033.26 | 2,090.62 | 1,445.75* | 1,129.31* | 1,135.21 | 893.30 |
| **Health Status** | | | | | | |
| Fertility Rate | .77* | .83* | .08 | .08 | .07 | .07 |
| Percent of Births to Teenage Women | 8.74* | 7.75* | 9.07 | 9.12 | 8.77 | 8.73 |
| Infant Mortality Rate | 152.29 | 151.14 | 167.49 | 158.35 | 126.59 | 125.61 |
| Deaths per 100,000 Population | 1,016.24 | 1,054.78 | 973.10* | 1,029.47* | 940.89 | 938.52 |
| Deaths per 100,000 - from Infective /Parasitic Diseases | 8.24 | 5.83 | 8.01 | 7.35 | 7.49 | 6.53 |
| Deaths per 100,000 - from Influenza /Pneumonia | 23.72 | 28.20 | 25.62 | 27.12 | 23.[illegible] | 22.80 |
| Deaths per 100,000 - from Cardio-Vascular Conditions | 518.20 | 550.69 | 487.19* | 542.07* | 474.56 | 486.64 |
| Incidence of Measles per 100,000 Population | 3.24 | 5.02 | 3.47* | 6.76* | 5.03 | 8.15 |
| Incidence of Mumps per 100,000 Population | 6.77 | 3.43 | 5.57 | 9.80 | 3.92 | 9.58 |
| Incidence of Rubella per 100,000 Population | 2.20 | 4.14 | 2.36 | 4.71 | 13.42 | 3.97 |
| **Health Utilization** | | | | | | |
| Inpatient Hospital Visits per 100,000 Pop. | 49,948.16* | 99,368.84* | 85,407.29 | 97,009.73 | 108,648.85 | 116,640.75 |
| Outpatient Hospital Visits per 100,000 Pop. | 50,136.89 | 44,797.36 | 70,257.16* | 53,144.69* | 86,320.77 | 80,112.12 |
| Emergency Hospital Visits per 100,000 Pop. | 14,949.62 | 16,684.33 | 26,050.32 | 22,780.74 | 31,942.60 | 32,322.22 |
| Inpatient Surgical Operations per 100,000 Pop. | 111.40 | 135.74 | 443.68* | 537.85* | 1,735.82* | 2,061.89* |
| Total Surgical Operations per 100,000 Pop. | 1,938.91 | 2,408.15 | 2,828.19* | 3,549.96* | 5,562.73* | 6,625.09* |
| **Crime** | | | | | | |
| Number of Murders per 100,000 Population | 5.48 | 4.31 | 4.93 | 5.01 | 6.84* | 5.12* |
| Number of Rapes per 100,000 Population | 5.48 | 5.38 | 7.12 | 6.83 | 10.36* | 7.93* |
| Number of Burglaries per 100,000 Population | 728.25 | 430.26 | 572.47 | 509.29 | 733.27* | 598.60* |

*Difference is significant at the $p < .05$ level using a two-tailed t-test.



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TABLE IV.6(c)

MEAN CHARACTERISTICS OF COUNTIES WHICH DID AND DID NOT GAIN YOUNG PHYSICIANS WITH NO NHSC EXPERIENCE, BY COUNTY POPULATION SIZE

| County Characteristics | County Population Under 10,000 | | 10,000 - 24,000 | | 25,000 and Over | |
|---|---|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| Number of Counties | 187.00 | 553.00 | 520.00 | 389.00 | 414.00 | 49.00 |
| **Population** | | | | | | |
| Population | 7,397.00* | 5,644.00* | 17,890.00* | 15,962.00* | 35,684.00* | 33,316.00* |
| Population Growth Rate | 15.62* | 9.01* | 15.60 | 15.17 | 13.31 | 21.42 |
| Percent White | 92.15 | 89.90 | 88.39* | 86.00* | 88.16 | 86.80 |
| Percent Black | 4.28 | 6.00 | 8.63* | 11.69* | 9.70 | 11.32 |
| Percent Spanish | 4.07 | 5.33 | 3.50 | 4.13 | 2.32 | 2.04 |
| Median School Years | 11.33 | 11.40 | 11.38* | 11.07* | 11.39* | 11.24* |
| Population Per Square Mile | 14.31* | 10.35* | 28.72* | 29.25 | 54.66 | 57.06 |
| **Cultural** | | | | | | |
| Number Colleges and Universities | .09* | .01* | .13* | .06* | .34 | .22 |
| Per Capita Educational Expenditures | 349.54 | 368.37 | 310.56* | 287.90* | 293.90 | 275.60 |
| Number of Urban Contiguous Cnties | .47 | .47 | .78* | .92* | 1.15 | 1.51 |
| **Economic** | | | | | | |
| Per Capita Income | 5,418.00 | 5,355.00 | 5,436.00* | 5,045.00* | 5,316.00 | 5,335.00 |
| Household Income | 11,274.00 | 11,114.00 | 11,264.00* | 10,681.00* | 11,800.00 | 11,729.00 |
| Growth Rate of Per Capita Income | 57.15 | 60.30 | 60.28* | 58.11* | 61.46 | 61.63 |
| Unemployment Rate | 9.11 | 8.21 | 10.69* | 11.61* | 11.61 | 12.00 |
| Labor Force Participation Rate | 47.28 | 46.38 | 46.51* | 44.37* | 45.75* | 42.37* |
| Percent Labor Force Construction | 8.35* | 7.53* | 7.44 | 7.43 | 6.90 | 8.13 |
| Percent Labor Force White Collar | 37.34* | 34.16* | 38.67* | 35.74* | 41.40 | 39.80 |
| Percent Labor Force Manufacturing | 13.23 | 13.12 | 20.92* | 23.95 | 24.70 | 25.71 |
| Percent Working in State /County of Residence | 80.30 | 77.80 | 79.82* | 72.30* | 81.10* | 71.82* |
| Percent Working in State /Not County of Residence | 16.80* | 19.50* | 17.44* | 24.55* | 16.38* | 24.50* |
| Percent Not Working in State of Residence | 2.90 | 2.60 | 2.73 | 3.15 | 2.52 | 3.68 |
| Percent Agricultural | 14.34* | 18.93* | 10.70* | 11.86* | 6.80 | 6.60 |
| Per Capita Farmer Income | 7,492.00 | 7,221.00 | 5,492.00 | 5,217.00 | 5,317.00 | 5,717.00 |
| Number of Farms | 429.00 | 408.00 | 741.00 | 730.00 | 898.00 | 844.00 |
| Farmland as Percent of Total Land | 5.90* | 6.90* | 5.93 | 6.06 | 5.35 | 5.58 |
| Occupied Housing Units Per Capita | .36 | .36 | .35 | .35 | .35* | .33* |
| Percent of Households Below Poverty Line | 13.65* | 15.34* | 13.49* | 15.40* | 11.90 | 13.10 |
| Percent Persons Below Poverty Line | 17.20* | 18.91* | 17.00* | 19.08* | 15.31 | 16.34 |
| Percent Households Lacking Complete Plumbing | 5.25 | 4.96 | 5.18* | 6.25* | 4.28 | 5.28 |
| Percent Population Receiving AFDC | 2.72 | 2.67 | 3.32* | 3.82* | 3.46 | 3.66 |
| **Health Resources** | | | | | | |
| Number of R.N. Schools | .01 | .01 | .08* | .02* | .24* | .08* |
| Number of FTE R.N.s per 100,000 Population | 171.10* | 123.00* | 164.32* | 120.00* | 219.75* | 147.50* |
| Number of Physician Extenders per 100,000 Population | 5.83 | 3.19 | 4.70* | 3.04* | 3.88 | 2.55 |
| Number of Hospitals | 1.68* | 1.22* | 2.43* | 1.80* | 3.17* | 2.57* |
| Number of Hospital Beds | 81.62* | 49.05* | 161.23* | 110.00* | 327.80* | 238.04* |
| Number of Hospital Beds per 100,000 Population | 1,195.00* | 889.00* | 922.50* | 691.00* | 922.40* | 721.14* |
| Number of Neonatal ICU Beds per 100,000 Population | 0.00 | 0.00 | .30 | .04 | .34* | 0.00* |
| Local Per Capita Expenditures for Health | 10.24* | 11.80* | 3.98 | 4.01 | 2.07 | 2.09 |
| Total Number of M.D.s | 4.63* | 2.08* | 12.12* | 6.30* | 29.94* | 19.10* |
| Number of Primary Care M.D.s | 2.98* | 1.58* | 6.94* | 4.49* | 13.84* | 9.67* |
| Total Number of D.O.s | .36 | .35 | .71 | .90 | 1.51 | 1.39 |

continued--



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TABLE IV.6(c) continued

| County Characteristics | County Population Under 10,000 Gained | Under 10,000 Failed to Gain | 10,000 - 24,000 Gained | 10,000 - 24,000 Failed to Gain | 25,000 and Over Gained | 25,000 and Over Failed to Gain |
|---|---|---|---|---|---|---|
| **Health Resources** | | | | | | |
| Number of Primary Care D.O.s | .35 | .31 | .64* | .84* | 1.22 | 1.27 |
| M.D.s-to-100,000 Population | 62.97* | 35.00* | 66.97* | 40.12* | 83.10* | 56.00* |
| Primary Care MDs to 100,000 Population | 41.16* | 27.09* | 39.29* | 28.26* | 38.70* | 28.90* |
| D.O.s to 100,000 Population | 4.44 | 5.69 | 4.00* | 5.79* | 4.40 | 3.76 |
| Primary Care D.O.s to 100,000 Population | 4.50 | 5.00 | 3.67* | 5.40* | 3.46 | 3.46 |
| M.D. Interns and Residents | .09 | .05 | .48* | .16* | .60 | .45 |
| **Environment** | | | | | | |
| January Temperature | 78.33* | 30.67* | 31.69* | 35.00* | 32.81 | 35.60 |
| July Temperature | 73.97* | 75.98* | 75.68* | 77.21* | 75.71 | 76.81 |
| January Precipitation | 1.87 | 1.69 | 2.51* | 2.75* | 2.86 | 3.05 |
| July Precipitation | 3.00 | 3.14 | 3.56* | 4.10* | 3.98 | 4.05 |
| Elevation in Feet | 2,253.00 | 2,030.00 | 1,349.00* | 953.00* | 942.00 | 968.00 |
| **Health Status** | | | | | | |
| Fertility Rate | 8.05 | 8.38 | 7.89 | 7.88 | 7.29 | 7.47 |
| Percent of Births to Teenage Women | 7.54 | 7.92 | 8.64* | 9.75* | 8.63* | 9.63* |
| Infant Mortality Rate | 143.50 | 153.80 | 156.92 | 163.64 | 138.13 | 166.90 |
| Deaths per 100,000 Population | 1,030.00 | 1,059.00 | 1,012.00 | 1,023.00 | 942.00 | 917.00 |
| Deaths per 100,000 - from Infective /Parasitic Diseases | 6.40 | 5.90 | 7.35 | 7.31 | 6.65 | 7.46 |
| Deaths per 100,000 - from Influenza /Pneumonia | 31.00 | 26.80 | 27.23 | 26.40 | 23.10 | 21.20 |
| Deaths per 100,000 - from Cardio-Vascular Conditions | 526.00 | 556.00 | 530.00 | 538.00 | 486.00 | 471.00 |
| Incidence of Measles per 100,000 Population | 5.35 | 4.72 | 8.29* | 3.48* | 7.55 | 6.87 |
| Incidence of Mumps per 100,000 Population | 5.82 | 5.44 | 9.11 | 9.14 | 6.86 | 21.11 |
| Incidence of Rubella per 100,000 Population | 8.62 | 2.42 | 3.92 | 4.89 | 6.45* | 2.06* |
| **Health Utilization** | | | | | | |
| Inpatient Hospital Visits per 100,000 Pop. | 129,222.00* | 84,062.00* | 107,304.00* | 78,923.00* | 118,506.00* | 85,676.00* |
| Outpatient Hospital Visits per 100,000 Pop. | 59,210.00* | 40,475.00* | 68,556.00* | 38,922.00* | 84,327.00* | 55,462.00* |
| Emergency Hospital Visits per 100,000 Pop. | 21,924.00* | 14,726.00* | 27,109.00* | 18,214.00* | 33,231.00* | 25,362.00* |
| Inpatient Surgical Operations per 100,000 Pop. | 208.00* | 109.00* | 638.00* | 342.00* | 2,085.00* | 1,206.00* |
| Total Surgical Operations per 100,000 Pop. | 3,178.00* | 2,098.00* | 4,200.00* | 2,412.00* | 6,644.00* | 4,322.00* |
| **Crime** | | | | | | |
| Number of Murders per 100,000 Population | 4.70 | 4.35 | 4.87 | 5.17 | 5.42 | 6.03 |
| Number of Rapes per 100,000 Population | 6.92 | 4.86 | 6.68 | 7.15 | 8.31 | 9.37 |
| Number of Burglaries per 100,000 Population | 610.00* | 401.00* | 539.00 | 494.00 | 640.00* | 317.00* |

*Difference is significant at the $p < .05$ level using a two-tailed t-test.



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TABLE IV.6(d)

MEAN CHARACTERISTICS OF COUNTIES WHICH DID AND DID NOT GAIN FPOs, BY COUNTY POPULATION SIZE

| County Characteristics | County Population Under 10,000 | | 10,000 - 24,000 | | 25,000 and Over | |
|---|---|---|---|---|---|---|
| | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| Number of Counties | 75 | 391 | 156 | 376 | 84 | 151 |
| **Population** | | | | | | |
| Population | 6,921.49* | 5,825.16* | 17,230.88 | 17,009.57 | 35,343.32 | 35,109.00 |
| Population Growth Rate | 14.32 | 10.69 | 21.31* | 14.20* | 17.49 | 15.34 |
| Percent White | 90.96 | 88.74 | 89.31 | 89.39 | 88.72 | 86.24 |
| Percent Black | 9.81 | 6.46 | 11.21 | 12.26 | 9.66 | 11.51 |
| Percent Spanish | 4.37 | 4.68 | 3.90 | 3.76 | 1.45 | 2.86 |
| Median School Years | 11.43 | 11.32 | 11.28* | 11.09* | 11.36 | 11.47 |
| Population Per Square Mile | 11.37 | 11.99 | 28.13 | 28.84 | 50.48 | 49.20 |
| **Cultural** | | | | | | |
| Number Colleges and Universities | .00* | .01* | .08 | .07 | .30 | .30 |
| Per Capita Educational Expenditures | 355.14 | 364.93 | 320.71* | 292.81* | 310.29 | 297.00 |
| Number of Urban Contiguous Cnties | .65 | .50 | .83 | .89 | 1.17 | 1.22 |
| **Economic** | | | | | | |
| Per Capita Income | 5,209.96 | 5,066.09 | 5,057.16 | 4,998.23 | 5,147.26 | 5,332.85 |
| Household Income | 10,867.45 | 10,823.71 | 10,648.31 | 10,716.29 | 11,199.58 | 11,623.28 |
| Growth Rate of Per Capita Income | 60.49 | 57.41 | 62.87* | 58.43* | 60.33 | 60.61 |
| Unemployment Rate | 8.97 | 9.25 | 12.69* | 11.69* | 13.36* | 11.86* |
| Labor Force Participation Rate | 47.43* | 44.57* | 44.60 | 44.52 | 43.48 | 44.33 |
| Percent Labor Force Construction | 8.13 | 7.65 | 7.76 | 7.39 | 6.99 | 7.23* |
| Percent Labor Force White Collar | 35.42 | 34.04 | 37.74* | 36.02* | 39.13* | 40.61* |
| Percent Labor Force Manufacturing | 14.29 | 14.10 | 20.93* | 24.28* | 25.18 | 23.97 |
| Percent Working in State /County of Residence | 77.80 | 75.54 | 76.31* | 73.03* | 76.95 | 79.26 |
| Percent Working in State /Not County of Residence | 18.06 | 21.45 | 20.31* | 23.58* | 19.39 | 17.97 |
| Percent Not Working in State of Residence | 4.14 | 2.76 | 3.39 | 3.39 | 3.65 | 2.77 |
| Percent Agricultural | 15.89* | 18.79* | 9.30* | 11.18* | 5.75 | 6.76 |
| Per Capita Farmer Income | 7,634.14 | 7,422.82 | 6,832.26 | 5,936.03 | 6,120.86 | 4,375.62 |
| Number of Farms | 472.08* | 388.00* | 630.41* | 723.64* | 800.33 | 869.52 |
| Farmland as Percent of Total Land | 6.02 | 6.40 | 4.93* | 5.61* | 3.86* | 5.05* |
| Occupied Housing Units Per Capita | .36* | .39* | .35 | .34 | .34 | .34 |
| Percent of Households Below Poverty Line | 14.16* | 16.51* | 14.93 | 15.64 | 12.91 | 13.21 |
| Percent Persons Below Poverty Line | 17.49* | 20.18* | 18.57 | 19.33 | 16.35 | 16.81 |
| Percent Households Lacking Complete Plumbing | 5.04 | 6.00 | 6.62 | 6.60 | 6.20* | 4.97* |
| Percent Population Receiving AFDC | 2.30* | 3.23* | 4.50 | 3.94 | 4.25 | 3.98 |
| **Health Resources** | | | | | | |
| Number of R.N. Schools | .01 | .01 | .03 | .03 | .15 | .20 |
| Number of FTE R.N.s per 100,000 Population | 139.59 | 122.58 | 130.87 | 124.37 | 194.93 | 202.88 |
| Number of Physician Extenders per 100,000 Population | 8.45 | 9.28 | 5.61* | 3.98* | 5.11 | 4.39 |
| Number of Hospitals | 1.45* | .99* | 2.05 | 1.94 | 3.04 | 3.08 |
| Number of Hospital Beds | 58.77* | 41.30* | 126.63 | 122.22 | 255.56* | 296.47* |
| Number of Hospital Beds per 100,000 Population | 957.77* | 895.57* | 765.97 | 721.25 | 731.94* | 836.26* |
| Number of Neonatal ICU Beds per 100,000 Population | .00 | .00 | .00 | .22 | .15 | .34 |
| Local Per Capita Expenditures for Health | 9.74 | 10.65 | 3.73 | 3.78 | 1.97 | 2.04 |
| Total Number of M.D.s | 2.47 | 2.07 | 8.39 | 8.60 | 23.60 | 27.32 |
| Number of Primary Care M.D.s | 1.85 | 1.52 | 5.00 | 5.24 | 11.88 | 12.53 |
| Total Number of D.O.s | .44* | .21* | .68 | .62 | 1.37 | 1.17 |

continued--



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TABLE IV.6(d) continued

| County Characteristics | County Population Under 10,000 Gained | Under 10,000 Failed to Gain | 10,000 - 24,000 Gained | 10,000 - 24,000 Failed to Gain | 25,000 and Over Gained | 25,000 and Over Failed to Gain |
|---|---|---|---|---|---|---|
| **Health Resources** | | | | | | |
| Number of Primary Care D.O.s | .31 | .20 | .54 | .55 | 1.24 | 1.13 |
| M.D.s-to-100,000 Population | 38.48 | 31.76 | 48.37 | 48.89 | 66.17 | 76.04 |
| Primary Care MDs to 100,000 Population | 28.22 | 23.78 | 29.51 | 30.41 | 33.67 | 34.99 |
| D.O.s to 100,000 Population | 6.38* | 3.33* | 4.14 | 3.78 | 3.68 | 3.27 |
| Primary Care D.O.s to 100,000 Population | 4.78 | 3.16 | 3.27 | 3.40 | 3.33 | 3.14 |
| M.D. interns and Residents | .08 | .06 | .21 | .48 | .58 | .62 |
| **Environment** | | | | | | |
| January Temperature | 30.26 | 29.24 | 32.03* | 34.24* | 31.82 | 32.90 |
| July Temperature | 75.31 | 74.96 | 74.85* | 76.65* | 74.15* | 75.54* |
| January Precipitation | 1.89 | 1.89 | 2.73 | 2.93 | 3.11 | 2.97 |
| July Precipitation | 2.96 | 3.25 | 3.72 | 3.97 | 4.06 | 3.93 |
| Elevation in Feet | 2,159.87 | 1,989.84 | 1,491.10* | 956.47* | 829.76 | 1,038.75 |
| **Health Status** | | | | | | |
| Fertility Rate | 8.00 | 8.29 | 8.11 | 7.89 | 7.17* | 7.61* |
| Percent of Births to Teenage Women | 7.76 | 8.13 | 9.34 | 9.53 | 9.05 | 8.83 |
| Infant Mortality Rate | 147.25 | 151.38 | 167.49 | 160.90 | 156.01 | 163.92 |
| Deaths per 100,000 Population | 1,068.88 | 1,019.89 | 979.89 | 1,002.10 | 960.32* | 916.61* |
| Deaths per 100,000 - from Infective /Parasitic Diseases | 7.42 | 6.23 | 7.38 | 7.74 | 6.91 | 7.16 |
| Deaths per 100,000 - from Influenza /Pneumonia | 26.74 | 27.01 | 24.65 | 26.27 | 22.51 | 21.97 |
| Deaths per 100,000 - from Cardio-Vascular Conditions | 556.66 | 525.81 | 500.69 | 520.94 | 488.69 | 465.60 |
| Incidence of Measles per 100,000 Population | 5.91 | 4.44 | 3.25 | 6.60 | 5.77 | 8.18 |
| Incidence of Mumps per 100,000 Population | 4.79 | 6.60 | 4.77 | 7.47 | 499 | 4.03 |
| Incidence of Rubella per 100,000 Population | 3.16 | 4.73 | 2.71 | 3.12 | 9.13 | 3.72 |
| **Health Utilization** | | | | | | |
| Inpatient Hospital Visits per 100,000 Pop. | 92,648.38 | 66,862.38 | 90,325.87 | 82,836.28 | 93,923.30 | 107,415.01 |
| Outpatient Hospital Visits per 100,000 Pop. | 43,563.10 | 35,677.90 | 39,752.74 | 51,661.09 | 86,504.31 | 80,139.14 |
| Emergency Hospital Visits per 100,000 Pop. | 17,622.71* | 11,927.36* | 25,990.60* | 20,376.60* | 33,851.75 | 30,767.95 |
| Inpatient Surgical Operations per 100,000 Pop. | 95.76 | 86.41 | 398.26 | 412.07 | 1,274.00* | 1,823.77* |
| Total Surgical Operations per 100,000 Pop. | 1,525.82 | 1,610.43 | 2,700.71 | 2,799.74 | 4,427.48* | 5,778.74* |
| **Crime** | | | | | | |
| Number of Murders per 100,000 Population | 5.07 | 4.36 | 6.10 | 5.16 | 6.30 | 5.96 |
| Number of Rapes per 100,000 Population | 6.82 | 4.87 | 8.36 | 6.95 | 9.74 | 8.53 |
| Number of Burglaries per 100,000 Population | 544.03 | 455.35 | 656.04* | 490.39* | 697.76 | 630.41 |

*Difference is significant at the $p < .05$ level, using a two-tailed t-test.



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TABLE IV.7(a)

MEAN CHARACTERISTICS OF COUNTIES WHICH DID AND DID NOT GAIN
ALL YOUNG PHYSICIANS, BY MMSA STATUS

| Characteristics | MMSA STATUS: Non-MMSA, Gained | Non-MMSA, Failed to Gain | Whole-MMSA Counties, Gained | Whole-MMSA Counties, Failed to Gain | Part-MMSA Counties, Gained | Part-MMSA Counties, Failed to Gain |
|---|---|---|---|---|---|---|
| Number of Counties | 532.00 | 346.00 | 378.00 | 439.00 | 309.00 | 88.00 |
| **Population** | | | | | | |
| Population | 25,345.00* | 11,118.00* | 18,055.00* | 9,690.00* | 24,627.00* | 14,520.00* |
| Population Growth Rate | 14.77* | 10.80* | 16.12* | 10.91* | 16.41 | 17.55 |
| Percent White | 90.75 | 90.68 | 82.34* | 86.16* | 92.16 | 94.53 |
| Percent Black | 6.73 | 6.48 | 14.61* | 10.16* | 4.70 | 2.75 |
| Percent Spanish | 2.96* | 5.44* | 4.00 | 4.71 | 2.58 | 2.20 |
| Median School Years | 11.64* | 11.43* | 10.98 | 11.05 | 11.75 | 11.80 |
| Population Per Square Mile | 39.72* | 20.81* | 31.39* | 18.69* | 31.46* | 23.33* |
| **Cultural** | | | | | | |
| Number Colleges and Universities | .24* | .09* | .06 | .03 | .25* | .02* |
| Per Capita Educational Expenditures | 305.24* | 331.26* | 299.35* | 329.88* | 340.28 | 352.62 |
| Number of Urban Contiguous Cnties | .85* | .61* | .90* | .72* | .83 | .72 |
| **Economic** | | | | | | |
| Per Capita Income | 5,766.00 | 5,689.00 | 4,850.00 | 4,887.00 | 5,528.00 | 5,650.00 |
| Household Income | 11,935.00 | 11,366.00 | 10,394.00 | 10,658.00 | 11,632.00 | 11,690.00 |
| Growth Rate of Per Capita Income | 60.08 | 62.00 | 60.50 | 58.80 | 59.84* | 53.42* |
| Unemployment Rate | 9.80* | 8.36* | 11.93* | 10.38* | 11.04 | 10.12 |
| Labor Force Participation Rate | 47.94 | 47.64 | 43.60 | 43.91 | 46.36 | 46.75 |
| Percent Labor Force Construction | 7.19 | 7.65 | 7.84* | 7.38* | 7.32 | 7.42 |
| Percent Labor Force White Collar | 40.62* | 36.26* | 36.33* | 33.42* | 40.36* | 37.63* |
| Percent Labor Force Manufacturing | 20.64* | 16.44* | 22.92* | 18.60* | 19.64* | 16.31* |
| Percent Working in State/County of Residence | 82.67* | 79.62* | 73.47 | 72.72 | 81.94* | 76.96* |
| Percent Working in State/Not County of Residence | 15.00* | 18.43* | 23.30 | 23.85 | 15.04* | 19.73* |
| Percent Not Working in State of Residence | 2.32 | 1.95 | 3.22 | 3.21 | 3.02 | 3.32 |
| Percent Agricultural | 10.40* | 15.10* | 9.72* | 16.95* | 9.40* | 15.30* |
| Per Capita Farmer Income | 5,381.00 | 6,050.00 | 6,794.00 | 5,547.00 | 7,128.00 | 5,520.00 |
| Number of Farms | 817.00* | 570.00* | 620.00 | 517.00 | 728.00 | 681.00 |
| Farmland as Percent of Total Land | 6.51* | 7.10* | 5.21* | 6.30* | 4.86* | 6.37* |
| Occupied Housing Units Per Capita | .36 | .36 | .34* | .35* | .35 | .36 |
| Percent of Households Below Poverty Line | 11.52* | 13.47* | 16.61 | 17.04 | 11.76 | 12.33 |
| Percent Persons Below Poverty Line | 14.87* | 16.95* | 20.42 | 20.85 | 15.09 | 15.26 |
| Percent Households Lacking Complete Plumbing | 3.67 | 4.06 | 7.46* | 6.56* | 4.28 | 4.07 |
| Percent Population Receiving AFDC | 2.64 | 2.39 | 4.27* | 3.54* | 3.51* | 2.89* |
| **Health Resources** | | | | | | |
| Number of R.N. Schools | .17* | .02* | .04* | .01* | .14* | .02* |
| Number of FTE R.N.s per 100,000 Population | 203.00* | 143.30* | 128.28* | 103.17* | 207.46* | 145.90* |
| Number of Physician Extenders per 100,000 Population | 3.92 | 3.45 | 4.50 | 3.93 | 5.98 | 7.39 |
| Number of Hospitals | 2.72* | 2.00* | 1.78* | 1.10* | 2.94* | 1.86* |
| Number of Hospital Beds | 237.34* | 108.17* | 116.43* | 57.88* | 233.50* | 109.30* |
| Number of Hospital Beds per 100,000 Population | 1,079.23 | 1,114.31 | 647.45 | 627.20 | 1,039.80* | 795.50* |
| Number of Neonatal ICU Beds per 100,000 Population | .28* | .04* | .04 | 0.00 | .43 | 0.00 |
| Local Per Capita Expenditures for Health | 4.36* | 9.62* | 4.71* | 8.10* | 4.19* | 8.89* |
| Total Number of M.D.s | 19.72* | 5.92* | 8.55* | 3.04* | 20.70* | 7.06* |
| Number of Primary Care M.D.s | 9.90* | 3.89* | 4.66* | 2.13* | 10.42* | 4.82* |
| Total Number of D.O.s | 1.23* | .79* | .38 | .33 | 1.19 | .97 |
| Number of Primary Care D.O.s | 1.01* | .75* | .30 | .30 | 1.10 | .91 |
| M.D.s-to-100,000 Population | 80.78* | 50.32* | 44.37* | 27.70* | 80.34* | 45.41* |
| Primary Care M.D.s to 100,000 Population | 43.96* | 36.27* | 25.63* | 21.00* | 43.11* | 33.40* |
| D.O.s to 100,000 Population | 5.62* | 7.72* | 2.51 | 3.34 | 4.92 | 6.33 |
| Primary Care D.O.s to 100,000 Population | 4.83* | 7.21* | 1.93* | 3.30* | 4.47 | 5.82 |
| M.D. Interns and Residents | .38* | .11* | .28* | .11* | .72* | .10* |

continued—



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Table IV.7(a) continued

| Characteristics | HMSA STATUS: Non-HMSA Gained | Non-HMSA Failed to Gain | Whole-HMSA Counties Gained | Whole-HMSA Counties Failed to Gain | Part-HMSA Counties Gained | Part-HMSA Counties Failed to Gain |
|---|---|---|---|---|---|---|
| **Environment** | | | | | | |
| January Temperature | 31.44* | 33.78* | 36.14* | 32.79* | 26.65 | 26.31 |
| July Temperature | 75.98* | 77.34* | 77.00 | 76.50 | 72.83 | 73.27 |
| January Precipitation | 2.29* | 1.88* | 3.07* | 2.39* | 2.29* | 1.78* |
| July Precipitation | 3.57 | 3.44 | 4.10* | 3.71* | 3.22 | 2.94 |
| Elevation in Feet | 1,372.00* | 1,828.00* | 1,139.00* | 1,921.00* | 1,541.00 | 1,772.00 |
| **Health Status** | | | | | | |
| Fertility Rate | 7.54* | 8.23* | 7.87* | 8.15* | 7.76 | 8.15 |
| Percent of Births to Teenage Women | 8.13 | 8.36 | 10.03* | 9.16* | 7.38 | 7.08 |
| Infant Mortality Rate | 153.03 | 157.55 | 168.88* | 159.04* | 145.28 | 149.32 |
| Deaths per 100,000 Population | 1,003.00 | 1,085.00* | 989.00 | 1,012.00 | 972.00 | 1,017.00 |
| Deaths per 100,000 - from Infective/ Parasitic Diseases | 6.50 | 6.26 | 7.93 | 6.73 | 6.97 | 5.39 |
| Deaths per 100,000 - from Influenza/Pneumonia | 26.62 | 28.74 | 26.00 | 25.50 | 25.80 | 22.73 |
| Deaths per 100,000 - from Cardio-Vascular Conditions | 528.50* | 575.10* | 503.80* | 529.40* | 498.00 | 535.00 |
| Incidence of Measles per 100,000 Population | 7.47 | 5.42 | 4.90 | 3.73 | 9.74* | 5.66* |
| Incidence of Mumps per 100,000 Population | 10.37 | 9.32 | 6.90 | 6.44 | 3.66 | 6.83 |
| Incidence of Rubella per 100,000 Population | 5.26 | 5.34 | 3.23 | 2.18 | 8.28 | 2.66 |
| **Health Utilization** | | | | | | |
| Inpatient Hospital Visits per 100,000 Pop. | 129,659.00* | 112,422.00* | 72,846.00 | 62,921.00 | 124,164.00* | 87,307.00* |
| Outpatient Hospital Visits per 100,000 Pop. | 71,713.00* | 53,267.00* | 54,522.00* | 29,410.00* | 88,402.00* | 44,429.00* |
| Emergency Hospital Visits per 100,000 Pop. | 29,482.00* | 21,961.00* | 21,802.00* | 12,160.00* | 31,182.00* | 19,124.00* |
| Inpatient Surgical Operations per 100,000 Pop. | 1,360.00* | 585.00* | 457.00* | 144.00* | 1,208.00* | 324.00* |
| Total Surgical Operations per 100,000 Pop. | 5,936.00* | 3,515.00* | 2,374.00* | 1,483.00* | 5,410.00* | 2,435.00* |
| **Crime** | | | | | | |
| Number of Murders per 100,000 Population | 4.56 | 4.72 | 6.10 | 5.10 | 4.33 | 5.07 |
| Number of Rapes per 100,000 Population | 6.89 | 5.90 | 6.35 | 5.70 | 8.81 | 8.03 |
| Number of Burglaries per 100,000 Population | 554.32* | 414.85* | 484.76* | 380.00* | 772.60 | 721.23 |

*Difference is significant at the $p < .05$ level using a one-tailed t-test



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TABLE IV.7(b)

MEAN CHARACTERISTICS OF COUNTIES WHICH DID AND DID NOT GAIN YOUNG PHYSICIANS WITH NHSC EXPERIENCE, BY HMSA STATUS

| Characteristics | HMSA STATUS: Non-HMSA Gained | Non-HMSA Failed to Gain | Whole-HMSA Counties Gained | Whole-HMSA Counties Failed to Gain | Part-HMSA Counties Gained | Part-HMSA Counties Failed to Gain |
|---|---|---|---|---|---|---|
| Number of Counties | 57.00 | 821.00 | 152.00 | 685.00 | 93.00 | 304.00 |
| **Population** | | | | | | |
| Population | 23,183.26* | 18,203.05* | 17,661.98* | 12,541.52* | 26,868.68* | 21,015.97* |
| Population Growth Rate | 18.16* | 12.87* | 17.44* | 12.34* | 17.69 | 16.35 |
| Percent White | 91.81 | 90.65 | 80.72* | 85.26* | 89.96* | 93.52* |
| Percent Black | 3.72* | 6.84* | 15.29* | 11.47* | 4.43 | 4.22 |
| Percent Spanish | 3.58 | 3.96 | 4.85 | 4.29 | 4.93* | 1.99* |
| Median School Years | 11.68 | 11.55 | 11.01 | 11.02 | 11.72 | 11.77 |
| Population Per Square Mile | 39.56 | 31.78 | 30.03* | 23.20* | 28.65 | 29.99 |
| **Cultural** | | | | | | |
| Number Colleges and Universities | .28 | .16 | .07 | .04 | .30* | .16* |
| Per Capita Educational Expenditures | 334.13 | 314.21 | 307.54 | 317.97 | 361.46* | 337.32* |
| Number of Urban Contiguous Cnties | .89 | .75 | .96* | .76* | .80 | .81 |
| **Economic** | | | | | | |
| Per Capita Income | 5,892.63 | 5,738.66 | 4,751.64 | 4,896.53 | 5,339.70* | 5,621.30* |
| Household Income | 11,651.42 | 11,715.00 | 10,259.09 | 10,600.93 | 11,141.75* | 11,799.66* |
| Growth Rate of Per Capita Income | 58.75 | 60.97 | 60.32 | 59.89 | 60.04 | 57.92 |
| Unemployment Rate | 10.57* | 9.14* | 12.27* | 10.82* | 12.46* | 10.39* |
| Labor Force Participation Rate | 46.98 | 47.89 | 45.33 | 45.87 | 45.58 | 46.72 |
| Percent Labor Force Construction | 7.12 | 7.39 | 7.94 | 7.51 | 7.11 | 7.41 |
| Percent Labor Force White Collar | 41.12* | 38.76* | 36.52* | 34.34* | 41.20* | 39.31* |
| Percent Labor Force Manufacturing | 20.28 | 18.90 | 21.77 | 20.28 | 19.31 | 18.79 |
| Percent Working in State/County of Residence | 83.01 | 81.36 | 71.49 | 73.41 | 82.61 | 80.29 |
| Percent Working in State/Not County of Residence | 14.87 | 16.46 | 24.89 | 23.32 | 14.40 | 16.59 |
| Percent Not Working in State of Residence | 2.14 | 2.18 | 3.61 | 3.13 | 3.01 | 3.11 |
| Percent Agricultural | 9.47* | 12.43* | 9.10* | 14.70* | 7.14* | 11.85* |
| Per Capita Farmer Income | 4,015.29* | 5,757.83* | 9,309.99 | 5,399.97 | 7,389.99 | 6,324.72 |
| Number of Farms | 713.42 | 719.88 | 604.26 | 554.20 | 674.15 | 731.31 |
| Farmland as Percent of Total Land | 5.57* | 6.81* | 5.05* | 5.98* | 4.03* | 5.55* |
| Occupied Housing Units Per Capita | .35* | .36* | .34 | .35 | .35* | .36* |
| Percent of Households Below Poverty Line | 11.52 | 12.34 | 16.94 | 16.83 | 12.61 | 11.06 |
| Percent Persons Below Poverty Line | 14.78 | 15.75 | 20.70 | 20.65 | 16.11 | 14.83 |
| Percent Households Lacking Complete Plumbing | 3.62 | 3.86 | 7.73 | 6.79 | 4.95 | 4.02 |
| Percent Population Receiving AFDC | 2.66 | 2.53 | 4.76* | 3.68* | 4.17* | 3.13* |
| **Health Resources** | | | | | | |
| Number of R.N. Schools | .12 | .11 | .05 | .02 | .17 | .10 |
| Number of FTE R.N.s per 100,000 Population | 207.24* | 177.62* | 138.25* | 179.24* | 204.02 | 190.64 |
| Number of Physician Extenders per 100,000 Population | 6.49* | 3.54* | 5.77* | 3.83* | 7.43 | 5.99 |
| Number of Hospitals | 2.79* | 2.41* | 1.48 | 1.39 | 3.16* | 2.56* |
| Number of Hospital Beds | 235.09* | 183.19* | 105.69* | 79.57* | 226.87 | 199.60 |
| Number of Hospital Beds per 100,000 Population | 1,065.70 | 1,092.36 | 532.19* | 659.33 | 860.51* | 1,019.83* |
| Number of Neonatal ICU Beds per 100,000 Population | 0.00* | .20* | 0.00 | .02 | .14 | .39 |
| Local Per Capita Expenditures for Health | 3.78* | 6.62* | 4.52* | 7.02* | 3.17* | 5.23* |
| Total Number of M.D.s | 19.12* | 13.95* | 8.08* | 4.96* | 23.11* | 16.00* |
| Number of Primary Care M.D.s | 9.32* | 7.41* | 4.40* | 3.02* | 11.09* | 8.39* |
| Total Number of D.O.s | 1.68 | 1.01 | .52* | .31* | 1.43 | 1.06 |
| Number of Primary Care D.O.s | 1.49 | .87 | .39 | .28 | 1.31 | .97 |

continued—



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Table IV.7(b) continued

| Characteristics | HMSA STATUS: Non-HMSA: Gained | Non-HMSA: Failed to Gain | Whole-HMSA Counties: Gained | Whole-HMSA Counties: Failed to Gain | Part-HMSA Counties: Attracted | Part-HMSA Counties: Failed to Attract |
|---|---|---|---|---|---|---|
| **Health Resources** | | | | | | |
| M.D.s-to-100,000 Population | 76.96 | 68.21 | 43.23* | 33.45 | 78.71 | 70.73 |
| Primary Care MDs to 100,000 Population | 39.82 | 41.01 | 23.38 | 23.08 | 40.60 | 41.07 |
| D.O.s to 100,000 Population | 6.80 | 6.43 | 3.69 | 2.94 | 4.75 | 5.01 |
| Primary Care D.O.s to 100,000 Population | 6.43 | 5.72 | 2.56 | 2.71 | 5.00 | 4.70 |
| M.D. Interns and Residents | .33 | .27 | .35* | .19* | .39 | .64 |
| **Environment** | | | | | | |
| January Temperature | 28.74* | 32.62* | 35.81* | 33.94* | 26.98 | 26.45 |
| July Temperature | 74.17* | 76.68* | 76.90 | 76.68 | 71.98* | 73.22* |
| January Precipitation | 1.99 | 2.14 | 2.90 | 2.65 | 2.75 | 2.15 |
| July Precipitation | 3.45 | 3.52 | 4.03 | 3.85 | 2.83* | 3.26* |
| Elevation in Feet | 1,688.77 | 1,458.42 | 1,236.07 | 1,373.71 | 1,673.34 | 1,566.18 |
| **Health Status** | | | | | | |
| Fertility Rate | .07* | .08* | .08* | .08* | .08 | .08 |
| Percent of Births to Teenage Women | 7.82 | 8.25 | 10.06* | 9.44* | 7.67 | 7.20 |
| Infant Mortality Rate | 151.05 | 155.07 | 171.24 | 161.76 | 154.02 | 143.77 |
| Deaths per 100,000 Population | 961.13* | 1,040.34* | 984.89 | 1,005.55 | 953.58 | 991.78 |
| Deaths per 100,000 - from Infective/ Parasitic Diseases | 8.28 | 6.28 | 8.15 | 7.09 | 7.22 | 6.44 |
| Deaths per 100,000 - from Influenza/Pneumonia | 25.56 | 27.59 | 24.30 | 26.05 | 24.00 | 25.51 |
| Deaths per 100,000 - from Cardio-Vascular Conditions | 488.47* | 550.90* | 500.14 | 521.74 | 471.13* | 516.91* |
| Incidence of Measles per 100,000 Population | 1.47* | 7.02* | 3.13 | 4.51 | 6.77 | 8.88 |
| Incidence of Mumps per 100,000 Population | 1.99* | 10.51* | 6.99 | 6.91 | 4.44 | 4.35 |
| Incidence of Rubella per 100,000 Population | 8.91 | 5.04 | 2.50 | 2.69 | 9.79 | 6.19 |
| **Health Utilization** | | | | | | |
| Inpatient Hospital Visits per 100,000 Pop. | 124,016.61 | 122,786.89 | 61,820.68 | 68,634.64 | 102,416.87 | 120,148.41 |
| Outpatient Hospital Visits per 100,000 Pop. | 78,739.98 | 63,449.79 | 58,620.39* | 36,770.52* | 88,626.43 | 79,604.27 |
| Emergency Hospital Visits per 100,000 Pop. | 32,629.44* | 26,093.64* | 20,235.86* | 15,693.85* | 30,870.56 | 27,786.63 |
| Inpatient Surgical Operations per 100,000 Pop. | 1,181.46 | 960.76 | 426.07* | 254.24* | 1,188.55 | 957.49 |
| Total Surgical Operations per 100,000 Pop. | 5,333.99 | 4,957.66 | 2,294.74 | 1,795.25 | 4,520.63 | 4,820.57 |
| **Crime** | | | | | | |
| Number of Murders per 100,000 Population | 5.07 | 4.39 | 6.13 | 5.41 | 5.26 | 4.26 |
| Number of Rapes per 100,000 Population | 6.02 | 6.53 | 6.36 | 5.91 | 11.46* | 7.77* |
| Number of Burglaries per 100,000 Population | 607.57* | 491.84* | 529.28* | 404.65* | 889.88 | 721.85 |

*Difference is significant at the $p < .05$ level using a one-tailed t-test.



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TABLE IV.7(c)

MEAN CHARACTERISTICS OF COUNTIES WHICH DID AND DID NOT GAIN YOUNG PHYSICIANS WITH NO NHSC EXPERIENCE, BY NHSA STATUS

| | NHSA STATUS | | | | | |
|---|---|---|---|---|---|---|
| | Non-NHSA | | Whole-NHSA Counties | | Part-NHSA Counties | |
| Characteristics | Gained | Failed to Gain | Gained | Failed to Gain | Gained | Failed to Gain |
| Number of Counties | 322.00 | 356.00 | 305.00 | 532.00 | 294.00 | 103.00 |
| **Population** | | | | | | |
| Population | 23,320.00* | 11,203.00* | 19,128.00* | 10,224.00* | 24,991.00* | 14,953.00* |
| Population Growth Rate | 14.64* | 11.11* | 16.00* | 11.70* | 16.48 | 17.18 |
| Percent White | 90.64 | 90.84 | 82.98 | 85.27 | 92.10 | 94.40 |
| Percent Black | 6.84 | 6.33 | 14.21* | 11.00* | 4.75 | 2.88 |
| Percent Spanish | 3.00* | 3.32* | 3.90 | 4.67 | 2.69 | 2.62 |
| Median School Years | 11.64* | 11.43* | 11.00 | 11.05 | 11.75 | 11.79 |
| Population Per Square Mile | 39.97* | 21.00* | 32.92* | 19.60* | 31.91* | 23.22* |
| **Cultural** | | | | | | |
| Number Colleges and Universities | .25* | .05* | .06 | .04 | .25* | .05* |
| Per Capita Educational Expenditures | 305.22* | 330.50* | 293.60* | 329.00* | 339.04 | 354.40 |
| Number of Urban Contiguous Cnties | .84* | .63* | .91* | .74* | .84 | .71 |
| **Economic** | | | | | | |
| Per Capita Income | 5,762.00 | 5,697.00 | 4,877.00 | 4,866.00 | 5,538.00 | 5,605.00 |
| Household Income | 11,928.00* | 11,392.00* | 10,466.00 | 10,580.00 | 11,673.00 | 11,568.00 |
| Growth Rate of Per Capita Income | 60.23 | 61.70 | 60.55 | 59.00 | 59.76* | 54.58* |
| Unemployment Rate | 9.80* | 8.43* | 12.10* | 10.50* | 11.10 | 10.13 |
| Labor Force Participation Rate | 47.95 | 47.63 | 43.52 | 43.91 | 46.46 | 46.40 |
| Percent Labor Force Construction | 7.18* | 7.65* | 7.80 | 7.47 | 7.33 | 7.36 |
| Percent Labor Force White Collar | 40.67* | 36.31* | 36.50* | 33.72* | 40.49* | 37.65* |
| Percent Labor Force Manufacturing | 20.64* | 16.57* | 23.10* | 19.11* | 19.57* | 17.00* |
| Percent Working in State/County of Residence | 82.83* | 79.39* | 74.34 | 72.32 | 82.28* | 76.70* |
| Percent Working in State/Not County of Residence | 14.84* | 18.60* | 22.60 | 24.20 | 14.84* | 19.62* |
| Percent Not Working in State of Residence | 2.33 | 1.95 | 3.10 | 3.30 | 2.88 | 3.69 |
| Percent Agricultural | 10.32* | 15.10* | 9.50* | 16.10* | 9.44* | 14.50* |
| Per Capita Farmer Income | 5,386.00 | 6,024.00 | 5,221.00 | 6,622.00 | 6,987.00 | 6,163.00 |
| Number of Farms | 819.00* | 575.00* | 639.00* | 520.00* | 733.00 | 676.00 |
| Farmland as Percent of Total Land | 6.49* | 7.10* | 5.15* | 6.19* | 4.90* | 6.04* |
| Occupied Housing Units Per Capita | .36 | .36 | .34* | .35* | .35 | .36 |
| Percent of Households Below Poverty Line | 11.53* | 13.40* | 16.44 | 17.10 | 17.76 | 12.22 |
| Percent Persons Below Poverty Line | 14.90* | 16.85* | 20.26 | 20.90 | 15.10 | 15.25 |
| Percent Households Lacking Complete Plumbing | 3.70 | 4.10 | 7.44 | 6.70 | 4.25 | 4.20 |
| Percent Population Receiving AFDC | 2.65 | 2.39 | 4.10 | 3.75 | 3.53* | 2.93* |
| **Health Resources** | | | | | | |
| Number of R.N. Schools | .17* | .02* | .04* | .01* | .15* | .02* |
| Number of FTE R.N.s per 100,000 Population | 203.84* | 143.90* | 129.41* | 106.00* | 213.00* | 139.34* |
| Number of Physician Extenders per 100,000 Population | 3.87 | 3.54 | 4.28 | 4.13 | 6.18 | 6.73 |
| Number of Hospitals | 2.73* | 2.01* | 1.92* | 1.11* | 3.00* | 1.85* |
| Number of Hospital Beds | 240.13* | 108.00* | 127.43* | 59.63* | 239.43* | 110.34* |
| Number of Hospital Beds per 100,000 Population | 1,077.00 | 1,110.00 | 690.15 | 606.00 | 1,061.00* | 759.00* |
| Number of Neonatal ICU Beds per 100,000 Population | .28* | .04* | .05 | 0.00 | .45 | 0.00 |
| Local Per Capita Expenditures for Health | 4.34* | 9.51* | 4.47* | 7.77* | 4.14* | 6.47* |
| Total Number of M.D.s | 20.00* | 5.90* | 9.40* | 3.31* | 21.32* | 7.22* |
| Number of Primary Care M.D.s | 10.01* | 3.90* | 5.02* | 2.27* | 10.68* | 4.88* |
| Total Number of D.O.s | 1.22* | .81* | .30 | .38 | 1.13 | 1.18 |
| Number of Primary Care D.O.s | 1.00 | .78 | .26 | .33 | 1.03 | 1.09 |
| M.D.s-to-100,000 Population | 81.34* | 50.35* | 47.00* | 26.50* | 82.28* | 44.97* |
| Primary Care MDs to 100,000 Population | 44.17* | 36.20* | 27.00* | 20.90* | 43.78* | 32.91* |
| D.O.s to 100,000 Population | 5.32* | 7.82* | 1.66* | 3.89* | 4.60* | 7.05* |
| Primary Care D.O.s to 100,000 Population | 4.72* | 7.31* | 1.59* | 3.30* | 4.19* | 6.43* |
| M.D. Interns and Residents | .38* | .11* | .30* | .12* | .75* | .12* |

continued—



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Table IV.7(c) continued

| Characteristics | HMSA STATUS: Non-HMSA Gained | Non-HMSA Failed to Gain | Whole-HMSA Counties Gained | Whole-HMSA Counties Failed to Gain | Part-HMSA Counties Gained | Part-HMSA Counties Failed to Gain |
|---|---|---|---|---|---|---|
| **Environment** | | | | | | |
| January Temperature | 31.50* | 33.63* | 36.21* | 33.17* | 28.70 | 28.22 |
| July Temperature | 76.00* | 77.27* | 76.86 | 76.63 | -72.83 | 73.20 |
| January Precipitation | 2.30* | 1.88* | 3.14* | 2.44* | 2.32* | 1.78* |
| July Precipitation | 3.38 | 3.43 | 4.11* | 3.75* | 3.20 | 3.03 |
| Elevation in Feet | 1,370.00* | 1,624.00* | 1,130.00* | 1,474.00* | 1,543.00 | 1,730.00 |
| **Health Status** | | | | | | |
| Fertility Rate | 7.54* | 8.21* | 7.90 | 8.10 | 7.75 | 8.11 |
| Percent of Births to Teenage Women | 8.14 | 8.33 | 10.00* | 9.30* | 7.37 | 7.16 |
| Infant Mortality Rate | 133.13 | 157.30 | 189.12 | 160.25 | 144.17 | 152.00 |
| Deaths per 100,000 Population | 1,003.00* | 1,083.00* | 984.00 | 1,012.00 | 970.00 | 1,019.30 |
| Deaths per 100,000 - from Infective/ Parasitic Diseases | 6.52 | 6.24 | 7.96 | 6.90 | 6.96 | 5.84 |
| Deaths per 100,000 - from Influenza/Pneumonia | 28.67 | 28.62 | 26.00 | 25.60 | 26.03 | 22.65 |
| Deaths per 100,000 - from Cardio-Vascular Conditions | 528.00 | 574.00 | 501.20* | 527.00* | 497.00 | 530.00 |
| Incidence of Measles per 100,000 Population | 7.39 | 5.30 | 5.07 | 3.80 | 10.00* | 3.83* |
| Incidence of Mumps per 100,000 Population | 10.54 | 9.10 | 6.94 | 6.91 | 3.37 | 6.83 |
| Incidence of Rubella per 100,000 Population | 5.32 | 5.25 | 3.30 | 2.29 | 8.63* | 2.47* |
| **Health Utilization** | | | | | | |
| Inpatient Hospital Visits per 100,000 Pop. | 130,172.00* | 112,155.00* | 77,114.00* | 61,842.00* | 127,597.00* | 82,877.00* |
| Outpatient Hospital Visits per 100,000 Pop. | 72,155.00* | 53,137.00* | 56,328.00* | 31,829.00* | 91,302.00* | 42,595.00* |
| Emergency Hospital Visits per 100,000 Pop. | 29,592.00* | 22,010.00* | 23,178.00* | 12,695.00* | 32,101.00* | 18,257.00* |
| Inpatient Surgical Operations per 100,000 Pop. | 1,580.00* | 382.00* | 515.40* | 193.60* | 1,248.00 | 336.00 |
| Total Surgical Operations per 100,000 Pop. | 5,976.00* | 3,525.00* | 2,506.00* | 1,330.00* | 5,596.00* | 2,357.00* |
| **Crime** | | | | | | |
| Number of Murders per 100,000 Population | 4.58 | 4.87 | 6.50* | 5.00* | 4.36 | 4.88 |
| Number of Rapes per 100,000 Population | 7.00 | 5.74 | 6.45 | 5.73 | 8.77 | 8.26 |
| Number of Burglaries per 100,000 Population | 558.00* | 413.00* | 464.00 | 406.42 | 769.90 | 736.30 |

*Difference is significant at the $p < .05$ level using a two-tailed t-test.



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TABLE IV.7(d)

MEAN CHARACTERISTICS OF HMSA COUNTIES WHICH DID AND DID NOT GAIN FPOS, BY HMSA STATUS

| Characteristics | HMSA Status: Whole-HMSA Counties, Gained | Whole-HMSA Counties, Failed to Gain | Part-HMSA Counties, Gained | Part-HMSA Counties, Failed to Gain |
|---|---|---|---|---|
| Number of Counties | 209.00 | 628.00 | 106.00 | 291.00 |
| **Population** | | | | |
| Population | 17,411.00* | 12,160.00* | 23,934.00 | 21,823.00 |
| Population Growth Rate | 18.44* | 11.54* | 19.00 | 15.81 |
| Percent White | 84.93 | 84.27 | 92.76 | 92.66 |
| Percent Black | 12.30 | 12.12 | 4.00 | 4.36 |
| Percent Spanish | 3.71 | 4.62 | 2.67 | 2.68 |
| Median School Years | 11.10 | 11.00 | 11.81 | 11.74 |
| Population Per Square Mile | 29.41* | 22.79* | 28.56 | 29.97 |
| **Cultural** | | | | |
| Number Colleges and Universities | .08* | .03* | .20 | .20 |
| Per Capita Educational Expenditures | 308.16 | 318.71 | 361.50* | 336.21* |
| Number of Urban Contiguous Counties | .92* | .76* | .79 | .81 |
| **Economic** | | | | |
| Per Capita Income | 4,993.00 | 4,843.00 | 5,439.00 | 5,597.00 |
| Household Income | 10,998.00 | 10,519.00 | 11,340.00* | 11,757.00* |
| Growth Rate of Per Capita Income | 62.23* | 58.67* | 60.44 | 57.68 |
| Unemployment Rate | 11.64 | 10.90 | 12.59* | 10.20* |
| Labor Force Participation Rate | 44.30 | 43.59 | 46.28 | 46.51 |
| Percent Labor Force Construction | 7.81 | 7.51 | 7.32 | 7.34 |
| Percent Labor Force White Collar | 38.46* | 34.16* | 39.72 | 39.77 |
| Percent Labor Force Manufacturing | 20.60 | 20.34 | 20.26 | 18.43 |
| Percent Working In State/County of Residence | 74.79 | 72.48 | 80.87 | 80.82 |
| Percent Working In State/Not County of Residence | 21.37* | 24.34* | 15.90 | 16.10 |
| Percent Not Working In State of Residence | 3.84 | 3.01 | 3.24 | 3.02 |
| Percent Agricultural | 10.67* | 14.68* | 8.40* | 11.60* |
| Per Capita Farmer Income | 9,478.00 | 6,321.00 | 9,211.00* | 5,884.00* |
| Number of Farms | 630.00* | 541.00* | 654.00 | 741.00 |
| Farmland as Percent of Total Land | 5.29* | 5.98* | 4.15* | 5.57* |
| Occupied Housing Units Per Capita | .35 | .34 | .35 | .35 |
| Percent of Households Below Poverty Line | 15.54* | 17.29* | 11.59 | 12.00 |
| Percent Persons Below Poverty Line | 19.26* | 21.13* | 14.68 | 15.30 |
| Percent Households Lacking Complete Plumbing | 6.82 | 7.01 | 4.77 | 4.03 |
| Percent Population Receiving AFDC | 3.83 | 3.90 | 4.07* | 3.12* |
| **Health Resources** | | | | |
| Number of R.N. Schools | .04* | .01* | .09 | .12 |
| Number of FTE R.N.s per 100,000 Population | 127.89* | 110.08* | 193.60 | 193.80 |
| Number of Physician Extenders per 100,000 Population | 4.84 | 3.97 | 8.79* | 5.44* |
| Number of Hospitals | 1.83* | 1.27* | 2.84 | 2.65 |
| Number of Hospital Beds | 117.26* | 73.30* | 199.26 | 206.43 |
| Number of Hospital Beds per 100,000 Population | 738.11* | 602.36* | 929.63 | 1,001.76 |
| Number of Neonatal ICU Beds per 100,000 Population | 0.00 | 0.03 | .12 | .41 |
| Local Per Capita Expenditures for Health | 5.06* | 7.07* | 3.97* | 9.03* |
| Total Number of M.D.s | 7.56* | 4.89* | 17.82 | 17.60 |
| Number of Primary Care M.D.s | 4.45* | 2.88* | 9.40 | 9.10 |
| Total Number of D.O.s | .47* | .31* | 1.46 | 1.03 |
| Number of Primary Care D.O.s | .38 | .27 | 1.24 | .98 |

continued—



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Table IV.7(d) continued

| Characteristics | HMSA Status: Whole-HMSA Counties — Gained | Whole-HMSA Counties — Failed to Gain | Part-HMSA Counties — Gained | Part-HMSA Counties — Failed to Gain |
|---|---|---|---|---|
| **Health Resources** | | | | |
| M.D.s-to-100,000 Population | 41.73* | 33.06* | 68.57 | 74.06 |
| Primary Care MDs to 100,000 Population | 25.73* | 22.21* | 39.34 | 41.55 |
| D.O.s to 100,000 Population | 3.76 | 2.85 | 6.11 | 4.91 |
| Primary Care D.O.s to 100,000 Population | 2.96 | 2.59 | 5.00 | 4.70 |
| M.D. Interns and Residents | .26 | .16 | .32 | .68 |
| **Environment** | | | | |
| January Temperature | 34.81 | 34.10 | 25.12 | 27.10 |
| July Temperature | 76.53 | 76.78 | 71.30* | 73.52* |
| January Precipitation | 2.79 | 2.66 | 2.32 | 2.12 |
| July Precipitation | 3.88 | 3.89 | 3.09 | 3.18 |
| Elevation in Feet | 1,453.00 | 1,314.00 | 1,316.00 | 1,619.00 |
| **Health Status** | | | | |
| Fertility Rate | 7.86 | 8.08 | 7.77 | 7.88 |
| Percent of Births to Teenage Women | 9.63 | 9.33 | 7.42 | 7.28 |
| Infant Mortality Rate | 163.53 | 163.47 | 151.87 | 144.10 |
| Deaths per 100,000 Population | 1,000.00 | 1,002.00 | 987.00 | 981.00 |
| Deaths per 100,000 - from Infective/ Parasitic Diseases | 6.89 | 7.41 | 8.00* | 6.11* |
| Deaths per 100,000 - from Influenza/Pneumonia | 26.11 | 29.60 | 21.60* | 26.30* |
| Deaths per 100,000 - from Cardio-Vascular Conditions | 513.00 | 520.00 | 507.00 | 506.00 |
| Incidence of Measles per 100,000 Population | 3.74 | 4.43 | 6.16 | 9.20 |
| Incidence of Mumps per 100,000 Population | 5.34 | 7.45 | 3.84 | 4.56 |
| Incidence of Rubella per 100,000 Population | 1.75 | 2.96 | 10.00 | 5.95 |
| **Health Utilization** | | | | |
| Inpatient Hospital Visits per 100,000 Pop. | 81,313.00* | 62,691.00* | 112,196.00 | 117,378.00 |
| Outpatient Hospital Visits per 100,000 Pop. | 34,001.00* | 36,323.00* | 80,837.00 | 77,860.00 |
| Emergency Hospital Visits per 100,000 Pop. | 22,719.00* | 14,453.00* | 32,162.00* | 27,178.00* |
| Inpatient Surgical Operations per 100,000 Pop. | 387.00* | 292.00* | 900.00 | 1,052.00 |
| Total Surgical Operations per 100,000 Pop. | 2,209.00* | 1,780.00* | 4,215.00 | 4,945.00 |
| **Crime** | | | | |
| Number of Murders per 100,000 Population | 6.52 | 5.52 | 4.86 | 4.36 |
| Number of Rapes per 100,000 Population | 6.35 | 5.87 | 12.33* | 7.29* |
| Number of Burglaries per 100,000 Population | 461.00 | 416.17 | 993.12* | 676.00* |

*Difference is significant at the $p < .05$ level, using a one-tailed t-test.



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## V. FINDINGS: MULTIVARIATE ANALYSIS OF COMMUNITY CHARACTERISTICS

### A. INTRODUCTION

The findings of the descriptive analysis provided evidence that there are characteristics of counties which are more, or less, attractive to young physicians and that there are differences between NHSC alumni and non-alumni in how these characteristics are associated with location choices. However, while the descriptive analysis identified factors which appeared to be positively or negatively associated with young physicians' location choices, it did not measure the magnitude of the effect, nor did it consider the interrelationships among variables which are associated with location choices. The purpose of the multivariate analyses of the impact of community characteristics on location choices was to measure the magnitude and significance of the association of selected variables on the probability that a specific county will gain any young physician, an NHSC alumnus, or a non-alumnus.

### B. FINDINGS

Results of the analysis of the effect of community characteristics on the probability that a 1974-1978 medical school graduate in primary care practice in a rural area would locate in a rural community with a particular set of characteristics are shown in Table V.1. Overall, the estimated model performs well and is highly significant. Although the $R^2$ values are relatively low, the estimated coefficients of many of the explanatory variables are statistically significant at the .05 level or above.

In Column (1), the model has been estimated for the dependent variable ANYDOC (i.e. coded 1, if any young physician located in that county; 0, otherwise) and the coefficients are estimates of the impact of the explanatory variables on the log odds that a community will gain any young physicians. From these coefficients, the conditional probabilities of gaining any young physician have been calculated and are shown in Column (2).

The population size variables, AMA2 and AMA3, are significant and contribute the greatest amount to the overall probability that a community will attract a young physician. This finding is consistent with findings of many prior studies which show that population dominates cross-sectional location studies. As population of a county moves from 10,000 to 25,000 the probability of attracting a young physician increases by 24%, when population increases from 25,000 to 50,000, this probability increases by another 46%. Other significant explanatory variables in the ANYDOC estimation are:

- "HMSA2" (indicating counties which are part-HMSAs) is, as expected, a positive and significant variable in explaining the probability that a county gains a young physician; designation as a part-HMSA increases the probability that a county will gain a young physician by 19%

- "College", the presence of a two-year or four-year college, increases the probability of gaining a young physician by 12%

- "WC80", the proportion of the employed population in white collar jobs, increases the probability of gaining a young physician by 6%

- "Farmpop", the proportion of the population on farms, decreases the probability of gaining a young physician by 5.5% and

- "MDPOP", the ratio of physicians to 100,000 population in the county, increases the probability of gaining a young physician by 16% when it changes from 40/100,000 to 80/100,000.

Evaluating the entire model at the sample mean, we obtain a mean conditional probability, $\bar{P}$, of .64; an estimated 64 percent of non-metropolitan counties will gain at least one young physician. The $R^2$ of the model is only .19.

When we re-estimated the model for the NHSCLOC and NONNHSC dependent variables, the results were substantially different. Clearly, when these two groups were combined in the ANYDOC analysis, the differences in community characteristics which are associated with gaining each type of physician were obscured:

- For non-alumni, the community characteristics which are significantly related to counties gaining a non-alumni are
  - population
  - population density
  - white collar employment levels
  - farm population level
  - proportion of the labor force that works in the county of residence
  - presence of a hospital
  - physician-to-population ratios

  Again, population and the physician-to-population ratios dominate the overall probability of gaining a non-alumni physician

- For NHSC alumni, nearly all the explanatory variables are significant, but the magnitudes, and the signs for some, are different from the results for non-alumni

  - While "population" continued to be an important factor, the magnitude of the effect on the probability of gaining an NHSC alumni is smaller

  - "population density" has a negative and insignificant effect on the probability of gaining an NHSC alumni; but a positive and significant impact on the probability of gaining a non-alumni

  - Both "per capita educational expenditures" and the presence of a "college" have a positive and significant effect on the probability that a community will gain an alumni.

  - The proportion of "white collar" workers is not significant for the alumni estimates; although "farm population" levels are negative and significant

  - The presence of a hospital is negatively and significantly related to gaining an NHSC alumni; the physician-population ratio exerts a positive but insignificant effect on alumni, but is significant and of greater magnitude (17%) for non-alumni

  - Counties which are whole HMSAs are positively and significantly associated with the location choices of NHSC alumni, though not to those of non-alumni; Part-HMSAs, however, are positively and significantly associated with alumni and non-alumni location.

Although nearly all the explanatory variables are significant in the estimated model for NHSC alumni, the overall $R^2$ is only .93. These findings suggest that there are differences between the community characteristics which are attractive to alumni and non-alumni and that, for NHSC alumni particularly, factors other than the characteristics of communities appear to intervene in the location decision. It seems likely the NHSC service, itself, is one of those intervening variables.

One of the strengths of a multivariate probability model is that the estimated coefficients can be used to calculate the probability of the occurrence of a particular event (e.g. gaining any young physician) for subgroups in the study, while controlling for the influence of other factors in the model. Tables V.2(a) and V.2(b) present the estimated probability that a county will attract any young physician for selected combinations of characteristics of counties. For each of the three population groups, the effects of HMSA status, population density, and presence or absence of a

hospital are examined in Table V.2(a). In Table V.2(b), for the three population groups, the effects of HMSA status, population density, and low versus high physician-population ratios are examined.

The important feature to note in Table V.2(a) and V.2(b) is that the probability that a county will attract any young physician varies considerably for selected combinations of community characteristics:

- From a low of 30% in non-HMSA counties of less than 10,000 population, with low population density, and no hospital, to a high of 92% in part-HMSA counties of over 25,000 population, with high population density, and a hospital.

- From a low of 24% in non-HMSA counties with less than 10,000 population, low population, and relatively few physicians, to a high of 94% in part-HMSA counties with population over 25,000, high population density, and a high physician-population ratio.

- The effect of increasing the physician-population ratio from "low" to "high" is to increase the probability that a HMSA county of less than 10,000 population will gain a young physician from 39% to 57%; however, hospital availability only adds 4% to the probability for a similar set of communities.

- Overall, the effect of increasing the availability of hospital and physician resources is greatest for the least populous counties and is relatively smaller for the most populous counties.

The purpose of the comparisons shown in Tables V.2(a) and (b) is primarily to demonstrate how this model could be used to estimate the probability tht a specific county, with a given set of characteristics, will attract a young physician. The estimated model could be applied, for example, to identify those counties which are most likely to attract a non-alumni physician and to identify those counties least likely to gain any young physician. Identification of these groups of counties could be of potential usefulness to the NHSC policy formulation process.

TABLE V.1

RESULTS OF LOGIT ANALYSIS: ALL YOUNG PHYSICIANS AND BY NHSC STATUS
(Maximum Likelihood Estimates)

| Explanatory Variable | (1) Gain - Not Gain Any Young Physician Log Odds of Gaining | (2) Any Young Physician $(\partial P/\partial X_j)$ | (3) Gain - Not Gain Non-Alumni Log Odds of Gaining | (4) Non-Alumni $(\partial P/\partial X_j)$ | (5) Gain - Not Gain NHSC alumni Log Odds of Gaining | (6) NHSC Alumni $(\partial P/\partial X_j)$ |
|---|---|---|---|---|---|---|
| CONSTANT | -3.255** | — | -3.955** | — | -3.471** | — |
| AMA2 | .926** | .225 | .946** | .232 | .999** | .079 |
| AMA3 | 2.097** | .428 | 2.017** | .447 | 1.465** | .143 |
| PPSQ75 | .007* | .054 | .009* | .069 | -0.006 | -.019 |
| EDUCATE | .000 | .005 | -.000 | -.009 | .002** | .021 |
| COLLEGE | .595* | .126 | .313 | .075 | .474* | .052 |
| URBAN | .056 | .013 | .089 | .022 | -.015 | -.001 |
| INCRATE | -.003 | -.007 | -.002 | -.006 | -.006 | -.006 |
| WC80 | .024* | .056 | .025* | .062 | .012 | .011 |
| FARMPOP | -.023** | -.054 | -.018* | -.043 | -.047** | -.041 |
| PERPOVF | -.005 | -.011 | -.008 | -.019 | .013 | .012 |
| WORKRES | .009 | .020 | .015** | .037 | -.003 | -.003 |
| HOSPITAL | .135 | .031 | .356* | .088 | -.459* | -.049 |
| NDPOP | .018** | .167 | .018** | .172 | .001 | .006 |
| HMSA1 | .439** | .104 | .100 | .025 | 1.389** | .128 |
| HMSA2 | .876** | .193 | .639** | .162 | 1.225** | .105 |
| $R^2$ | .198 | | .217 | | .093 | |
| CONDITIONAL PROBABILITY $(\bar{P})^a$ | .644 | | .574 | | | .107 |

*Significant at the P < .05 level.
**Significant at the P < .10 level.

[a] P is the conditional probability obtained by evaluating the entire model at the sample mean. The equation used to compute P is $1/1+e^{-t}$, $t = \Sigma a_j X_j + a_0$ where $a_j$ = coefficient, $X_j$ = mean value, $a_0$ constant, and j = number of explanatory variables.

TABLE V.2(a)

ESTIMATED PROBABILITIES OF ATTRACTING A PHYSICIAN FOR SELECTED CHARACTERISTICS OF COUNTIES[a]

| County Population | Whole HMSA County | | Non-HMSA County | | Part-HMSA County | |
|---|---|---|---|---|---|---|
| | High Population Density | Low Population Density | High Population Density | Low Population Density | High Population Density | Low Population Density |
| | | | Category 1: No Hospital | | | |
| Population less than 10,000 | .45 | .40 | .35 | .30 | .56 | .50 |
| Population 10,000 - 25,000 | .68 | .62 | .57 | .52 | .76 | .72 |
| Population over 25,000 | .87 | .84 | .81 | .78 | .91 | .89 |
| | | | Category 2: Hospital Present | | | |
| Population less than 10,000 | .49 | .43 | .38 | .33 | .60 | .54 |
| Population 10,000 - 25,000 | .71 | .65 | .61 | .55 | .79 | .75 |
| Population over 25,000 | .89 | .86 | .83 | .80 | .92 | .90 |

[a]For all variables in the model, other than the specific variables in the different cohorts, the mean values were used to evaluate the expression.

$$P = \frac{1}{1 + e^{-t}}$$

where: $t = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \ldots$ and P is the estimated probability for each cohort. See Theil (1972) for discussion of methods to calculate probabilities for cohorts.

TABLE V.2(b)

ESTIMATED PROBABILITIES OF ATTRACTING A PHYSICIAN FOR SELECTED CHARACTERISTICS OF COUNTIES[a]

| County Population | Whole HMSA County | | Non-HMSA County | | Part-HMSA County | |
|---|---|---|---|---|---|---|
| | High Population Density | Low Population Density | High Population Density | Low Population Density | High Population Density | Low Population Density |
| | | | Category 1: No Hospital | | | |
| Population less than 10,000 | .39 | .33 | .29 | .24 | .49 | .44 |
| Population 10,000 - 25,000 | .61 | .56 | .51 | .45 | .71 | .66 |
| Population over 25,000 | .84 | .80 | .77 | .72 | .89 | .86 |
| | | | Category 2: Hospital Present | | | |
| Population less than 10,000 | .57 | .51 | .46 | .40 | .67 | .61 |
| Population 10,000 - 25,000 | .77 | .72 | .68 | .63 | .84 | .80 |
| Population over 25,000 | .91 | .89 | .87 | .84 | .94 | .93 |

[a]For all variables in the model, other than the specific variables in the different cohorts, the mean values were used to evaluate the expression.

$$P = \frac{1}{1 + e^{-t}}$$

where: $t = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \ldots$ and P is the estimated probability for each cohort. See Theil (1972) for discussion of methods to calculate probabilities for cohorts.

# VI. SUMMARY AND DISCUSSION

## A. OVERVIEW

The analytic findings presented in this report concentrate on two issues:

- o distributional patterns of young physicians in non-metropolitan areas
- o characteristics of non-metropolitan communities in which young physicians did and did not locate.

In this chapter, we briefly summarize the major findings reported in Chapters III, IV, and V and describe profiles of communities which are and are not attractive to young physicians.

## B. DISTRIBUTIONAL PATTERNS

We have examined distributional patterns in two stages: Stage 1: the flow of young physicians into counties between 1975 and 1979; and Stage 2: the location choices of 1974 to 1978 medical and osteopathic school graduates.

Findings of the Stage 1 analysis indicate that:

- o Between 1975 and 1979, 40 percent of nonmetropolitan counties gained at least 1 young physician.
- o The North and West Census Region counties were most likely to have gained young physicians. However, the South and Central Regions had a larger number of counties which gained young physicians.
- o Of 2,111 non-metropolitan counties, 641 (30 percent) had no young physicians in either 1975 or 1979.
- o Only 21 percent of counties with less than 10,000 population gained young physicians; 61 percent of counties with 25,000 or more population added one or more young physicians between 1975 and 1979.
- o Sixty percent of counties which gained one or more young physicians experienced an increase in total supply of physicians between 1975 and 1979.

- Of all counties which added young physicians between 1975 and 1979, 69 percent gained one or two; only 14 percent gained 5 or more. Counties with population under 10,000 were most likely (88 percent) to have gained only 1 or 2 young physicians. Counties in the North and West Census Region were most likely to have added 3 or more young physicians.

- Population, population growth rate, health resources, growth rate of per capita income, and proportion of the population agricultural were the characteristics which best distinguished counties which gained or lost young physicians.

Findings of the Stage 2 analysis relate to the distributional patterns of 1974 through 1978 graduates, separately by NHSC experience. These results indicate that:

- Of 2,111 non-metropolitan counties with population under 50,000, 58 percent gained at least one 1974 to 1978 graduate.

- Counties in the North Census Region were most likely to have gained a young physician.

- When counties are classed by population size, it is observed that

  -- 31 percent of counties with less than 10,000 population gained a physician

  -- 62 percent of counties of 10,000 to 25,000 population gained a physician

  -- 92 percent of counties with 25,000 to 50,000 population gained a physician.

- While 78 percent of part-HMSAs and 61 percent of non-HMSAs gained a physician, only 45 percent of whole county HMSAs gained a physician.

- In 5 percent of counties, NHSC alumni were the only physician locating in the area.

- Overall, counties with lower population and counties designated as HMSAs were most likely to gain NHSC alumni:

-- 50 percent of counties which were attractive to NHSC alumni were whole county HMSAs while only 27 percent of counties which attracted non-NHSC physicians were whole county HMSAs

-- 31 percent of part-HMSAs gained NHSC alumni, while only 26 percent of part-HMSA counties attracted non-NHSC physicians

-- Overall, 81 percent of counties in which NHSC alumni located were wholly or partially-designated HMSAs; only 53 percent of counties attracting non-NHSC physicians were HMSAs.

- The diffusion hypothesis is supported, though weakly, by the distributional patterns of the 1974 through 1978 graduates cohort; later graduates appear slightly more likely to locate in less populous areas.

The findings of the distributional patterns analysis suggest that there are differences in the choices being made by non-NHSC physicians and by NHSC alumni. The community characteristics analysis was designed to identify the factors which appear to be associated with these different choices.

## C. COMMUNITY CHARACTERISTICS

When the characteristics of counties which gained and failed to gain young physicians are compared descriptively, the findings indicate that:

- Counties in which young physicians located are more populous, have higher population growth rates, have less Hispanic population, have a better educated population, and a greater population density.

- These counties are more likely to have colleges and universities and to have urban contiguous counties. In counties with over 10,000 population, higher per capita expenditures for education are observed in counties which are attractive to young physicians.

- With respect to economic variables, higher income levels are observed in gaining counties, and the workforce is more heavily concentrated in white collar and manufacturing activities; there are fewer farmers and a smaller percentage of land is in farmland. Gaining counties also tend to have higher unemployment rates and a higher proportion of the population receiving AFDC payments.

- Health resources are more available in counties which were attractive to young physicians. However, per capita public expenditures for health are lower in these counties.

- With respect to environment, counties in which young physicians located are cooler, have more winter precipitation, and are at lower elevations. These findings are probably related to distributional patterns by Census Region.

- Health status variables do not present a consistent profile; counties which gained young physicians have fewer births and deaths per capita, and a higher incidence of measles.

- Health utilization per capita is consistently higher in gaining counties. This finding may reflect the greater supply of health resources in these counties or may indicate high levels of demand for care.

- Crime levels are higher in gaining counties.

Overall, the results of the comparison of characteristics of communities in which young physicians did and did not locate are consistent both with prior expectations and with the results of the limited Stage 1 analysis. Comparisons of these patterns for physicians of different types, however, were of considerable interest.

Comparison of distinguishing characteristics of communities in which non-NHSC physicians and NHSC alumni located reveals that communities which NHSC alumni chose have:

- smaller populations
- lower population density
- larger minority populations
- lower income levels
- higher unemployment rates
- fewer health resources
- less health care utilization per capita

These findings suggest that NHSC alumni are choosing practice locations which are distinctly different and in greater need of additional physician services.

Comparison of the characteristics of communities selected by NHSC M.D. alumni and D.O. alumni supports previous research findings that suggest that osteopathic physicians are more inclined to locate in more rural, agricultural areas than are M.D.s. NHSC alumni who are osteopathic physicians choose counties which, relative to those chosen by M.D. alumni, have:

- o less population
- o lower population densities
- o fewer minorities
- o higher educational levels
- o higher per capita incomes
- o lower unemployment rates
- o fewer white collar workers
- o more farms
- o less poverty
- o fewer health resources
- o fewer M.D. physicians, but more D.O. physicians
- o very low health care utilization levels

Osteopathic physicians appear to be more likely to choose locations which are unlikely to be attractive to M.D.s, generally. These areas tend to be agricultural, and to have the fewest health resources and associated utilization levels.

Recent PPOs located in those HMSA counties which have:

- o more population and have a higher population growth rate
- o fewer low income families
- o less agriculture
- o more health resources

- o higher health care utilization
- o higher crime rates.

These results, for the most part, are not surprising. The fact that recent PPOs choose more populous and growing HMSAs in which to locate suggests that some PPOs may be considering long run practice opportunities in choosing a PPO practice location.

Comparisons of M.D. PPO and D.O. PPO community characteristics yield findings similar to those for M.D. and D.O. alumni. Osteopathic physicians tend to choose HMSA locations which are less populated, less dense, more agricultural; they choose areas with fewer health resources than do M.D. PPOs. Overall it appears that D.O. PPOs, unlike M.D. PPOs, locate in HMSAs which are representative of all HMSAs.

The consistency of the findings for recent PPOs and NHSC alumni suggests that:

- o Some PPOs select communities in which they intend to remain permanently in practice, and/or
- o The NHSC experience had a significant effect on later location decisions of alumni.

## D. MULTIVARIATE ANALYSIS

Results of the multivariate analysis suggest that counties are more likely to be attractive to young physicians, in general, when they have:

- o Greater population. As population of a county increases from 10,000 to 25,000, the probability of attracting a young physicians increases by 24 percent; when population increases from 25,000 to 50,000, this probability increases by another 46 percent.
- o More physicians. As the ratio of physicians-to-population increases from 40/100,000 to 80/100,000, the probability that the county will gain a young physician increases by 16 percent.
- o A college. Counties which have a two- or four-year college have a 12 percent higher probability of gaining a young physician.

- o White collar employment. An increase in the proportion of the employed population in white collar jobs, from 30 percent to 40 percent, increases the probability of attracting a young physician by 6 percent.

- o Farm population. As the proportion of the population on farms increases from 10 percent to 20 percent, the probability of attracting any young physicians decreases by 5.5 percent.

When the model was re-estimated separately to evaluate the factors associated with a county's gaining an NHSC alumni or non-alumni, results were substantially different:

- o For non-alumni, the community characteristics which are significantly related to counties gaining a non-alumni are

  -- population
  -- population density
  -- white collar employment levels
  -- farm population level
  -- proportion of the labor force that works in the county of residence
  -- presence of a hospital
  -- physician-to-population ratios

  Again, population and the physician-to-population ratios dominate the overall probability of gaining a non-alumni physician

- o For NHSC alumni, nearly all the explanatory variables are significant, but the magnitudes, and the signs for some, are different from the results for non-alumni

  -- While "population" continues to be an important factor, the magnitude of the effect on the probability of attracting an NHSC alumni is smaller.

  -- "Population density" has a negative and insignificant effect on the probability of attracting an NHSC alumni; but a positive and significant impact on the probability of attracting a non-alumni

  -- Both "per capita educational expenditures" and the presence of a "college" have a positive and significant effect on the probability that a community will attract an alumni.

-- The proportion of "white collar" workers is not significant for the alumni estimates; although "farm population" levels are negative and significant

-- The presence of a hospital is negatively and significantly related to attracting an NHSC alumni; the physician-population ratio is an insignificant effect for the alumni and the magnitude of this effect is much smaller for NHSC alumni (0.8%) than for non-alumni (17%)

-- Counties which are whole HMSAs are positively and significantly associated with attractiveness to NHSC alumni, though not to non-alumni. Part-HMSAs are positively and significantly associated with location choices of both alumni and non-alumni.

These findings suggest that there are differences between the community characteristics which are attractive to alumni and non-alumni and that, for NHSC alumni particularly, factors other than the characteristics of communities appear to intervene in the location decision. It seems likely that the NHSC service, itself, is one of those intervening variables.

APPENDIX A

Additional Tables

- NHSC M.D. Alumni, Distribution by Region, Population, and HMSA Status.
- NHSC D.O. Alumni, Distribution by Region, Population, and HMSA Status.
- PPO M.D.'s, Distribution by Region, Population, and HMSA Status.
- PPO D.O.'s, Distribution by Region, Population, and HMSA Status.

TABLE A.1

DISTRIBUTION OF COUNTIES WHICH DID AND DID NOT GAIN YOUNG M.D.S
WITH NHSC EXPERIENCE, BY REGION, COUNTY POPULATION, AND COUNTY HMSA STATUS

| Physician Supply | All Non-Metropolitan Counties | Region | | | | County Population | | | HMSA Status | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | North | Central | South | West | Under 10,000 | 10,000 -25,000 | Over 25,000 | Non-HMSA | Whole-HMSA | Part-HMSA |
| Failed to Gain | 87.0% (1838) | 63.0 (38) | 91.0 (727) | 87.0 (842) | 80.0 (231) | 93.0 (688) | 86.0 (782) | 79.0 (368) | 94.0 (826) | 84.0 (699) | 79.0 (213) |
| Gained Physicians | 13.0 (274) | 37.0 (22) | 9.0 (68) | 13.0 (126) | 20.0 (58) | 7.0 (52) | 14.0 (127) | 21.0 (95) | 6.0 (52) | 16.0 (138) | 21.0 (84) |
| Number Gained | | | | | | | | | | | |
| 1 - 2 | 93.8 | 82.0 | 96.0 | 96.0 | 91.0 | 98.0 | 96.0 | 88.0 | 96.0 | 94.0 | 92.0 |
| 3 - 4 | 5.4 | 18.0 | 4.0 | 4.0 | 7.0 | 2.0 | 4.0 | 11.0 | 4.0 | 6.0 | 7.0 |
| 5 - 6 | .4 | - | - | - | 2.0 | - | - | 1.0 | - | - | 1.0 |
| 7 or More | - | - | - | - | - | - | - | - | - | - | - |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| TOTAL | | | | | | | | | | | |
| Number | 2112 | 60 | 795 | 968 | 289 | 740 | 909 | 463 | 878 | 837 | 397 |
| Percent | 100% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

TABLE A.2

DISTRIBUTION OF COUNTIES WHICH DID AND DID NOT GAIN YOUNG D.O.S
WITH NHSC EXPERIENCE, BY REGION, COUNTY POPULATION, AND COUNTY HMSA STATUS

| Physician Supply | All Non-Metropolitan Counties | Region | | | | County Population | | | HMSA Status | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | North | Central | South | West | Under 10,000 | 10,000 -25,000 | Over 25,000 | Non-HMSA | Whole-HMSA | Part-HMSA |
| Failed to Gain | 98.0% (2072) | 95.0 (57) | 98.0 (780) | 99.0 (956) | 97.0 (279) | 99.0 (733) | 97.0 (886) | 98.0 (453) | 99.0 (873) | 98.0 (819) | 96.0 (380) |
| Gained Physicians | 2.0 (40) | 5.0 (3) | 2.0 (15) | 1.0 (12) | 3.0 (10) | 1.0 (7) | 3.0 (23) | 2.0 (10) | 1.0 (5) | 2.0 (18) | 4.0 (17) |
| Number Gained | | | | | | | | | | | |
| 1 - 2 | 97.5 | 67.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 90.0 | 100.0 | 100.0 | 94.0 |
| 3 - 4 | 2.5 | 33.0 | - | - | - | - | - | 10.0 | - | - | 6.0 |
| 5 - 6 | - | - | - | - | - | - | - | - | - | - | - |
| 7 or More | - | - | - | - | - | - | - | - | - | - | - |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| TOTAL | | | | | | | | | | | |
| Number | 2112 | 60 | 795 | 968 | 289 | 740 | 909 | 463 | 878 | 837 | 397 |
| Percent | 100% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

TABLE A.3

DISTRIBUTION OF COUNTIES WHICH DID AND DID NOT GAIN
PPO M.D.S, BY REGION, COUNTY POPULATION, AND COUNTY HMSA STATUS

| Physician Supply | All Non-Metropolitan Counties | Region | | | | County Population | | | HMSA Status | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | North | Central | South | West | Under 10,000 | 10,000 -25,000 | Over 25,000 | Whole-HMSA | Part-HMSA |
| Failed to Gain | 80.1% (989) | 63.5 (33) | 85.6 (357) | 80.4 (463) | 72.0 (136) | 89.7 (419) | 76.7 (408) | 68.9 (162) | 81.0 (679) | 78.0 (310) |
| Gained Physicians | 19.9 (245) | 36.5 (19) | 14.4 (60) | 19.6 (113) | 28.0 (53) | 10.3 (48) | 23.3 (124) | 31.1 (73) | 19.0 (158) | 22.0 (87) |
| Number Gained | | | | | | | | | | |
| 1 - 2 | 94.3 | 90.0 | 94.0 | 94.0 | 96.0 | 98.0 | 97.0 | 88.0 | 93.0 | 95.0 |
| 3 - 4 | 5.3 | 10.0 | 6.0 | 5.0 | 4.0 | 2.0 | 3.0 | 11.0 | 6.0 | 5.0 |
| 5 - 6 | 0.4 | - | - | 1.0 | - | - | - | 1.0 | 1.0 | - |
| 7 or More | - | - | - | - | - | - | - | - | - | - |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| TOTAL | | | | | | | | | | |
| Number | 2112 | 52 | 417 | 576 | 189 | 467 | 532 | 235 | 837 | 397 |
| Percent | 100% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

TABLE A.4

DISTRIBUTION OF COUNTIES WHICH DID AND DID NOT GAIN
PPO D.O.S BY REGION, COUNTY POPULATION, AND COUNTY HMSA STATUS

| Physician Supply | All Non-Metropolitan Counties | Region | | | | County Population | | | HMSA Status | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | North | Central | South | West | Under 10,000 | 10,000 -25,000 | Over 25,000 | Whole-HMSA | Part-HMSA |
| Failed to Gain | 93.3% (1151) | 92.3 (48) | 91.9 (383) | 94.4 (544) | 93.1 (176) | 93.6 (437) | 93.2 (496) | 92.8 (218) | 93.0 (779) | 94.0 (372) |
| Gained Physicians | 6.7 (83) | 7.7 (4) | 8.2 (34) | 5.6 (32) | 6.9 (13) | 6.4 (30) | 4.0 (37) | 4.0 (17) | 7.0 (58) | 6.0 (25) |
| Number Gained | | | | | | | | | | |
| 1 - 2 | 98.0 | 100.0 | 94.0 | 100.0 | 100.0 | 97.0 | 97.0 | 100.0 | 98.0 | 100.0 |
| 3 - 4 | 2.0 | - | 6.0 | - | - | 3.0 | 3.0 | - | 2.0 | - |
| 5 - 6 | - | - | - | - | - | - | - | - | - | - |
| 7 or More | - | - | - | - | - | - | - | - | - | - |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| TOTAL | | | | | | | | | | |
| Number | 1234 | 52 | 417 | 576 | 189 | 467 | 532 | 235 | 837 | 397 |
| Percent | 100% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |